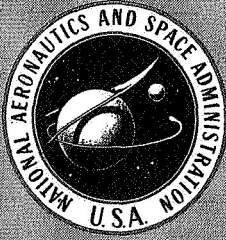


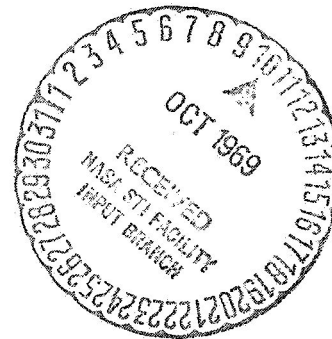
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AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SEPTEMBER 1969

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
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In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis will be placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

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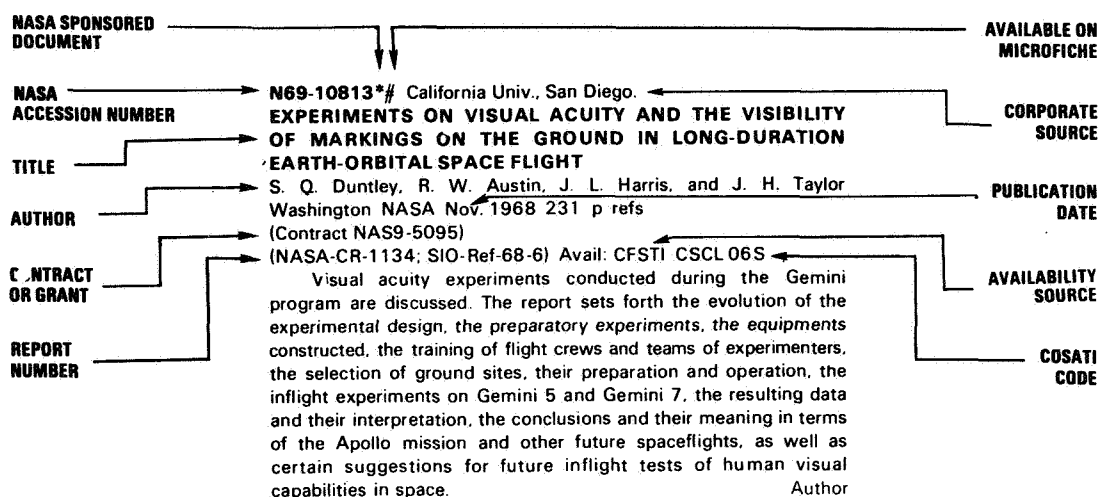
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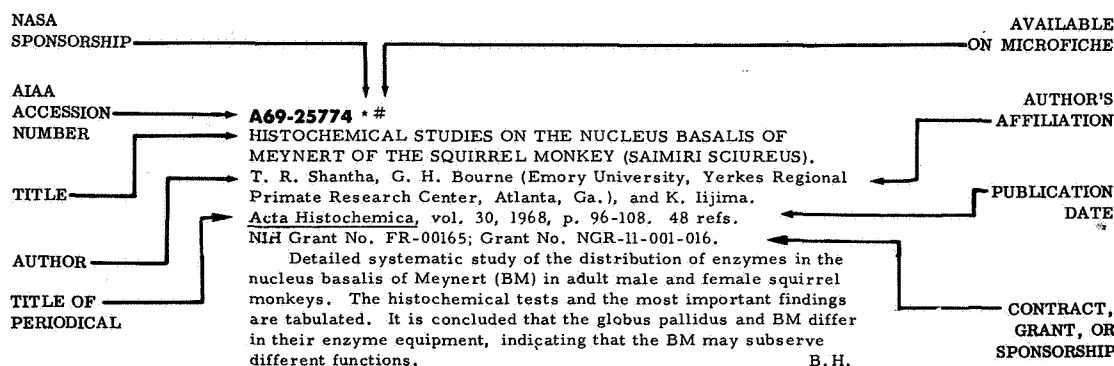
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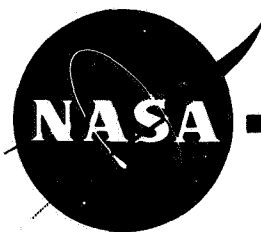
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AEROSPACE MEDICINE AND BIOLOGY

a continuing bibliography SEPTEMBER 1969

STAR ENTRIES

N69-27601# Joint Publications Research Service, Washington, D.C.

APPLICATIONS OF COMPUTER TECHNOLOGY IN MEDICINE

21 May 1969 21 p refs Transl. into ENGLISH from Vychislitel'naya Tekhn. v Fiz. i Med. (USSR), 1968 p 151-162, 172-177

(JPRS-48079) Avail: CFSTI

CONTENTS:

1. METHODS AND SOME OF THE RESULTS OF AUTOCORRELATION AND SPECTRAL ANALYSIS OF CARDIAC RHYTHM R. M. Bayevskiy et al p 1-12 refs (See N69-27602 15-04)

2. USE OF MULTIDIMENSIONAL REGRESSION ANALYSIS IN PREDICTING THE QUALITY OF FLIGHT TRAINING Ye. I. Garber et al p 13-19 refs (See N69-27603 15-05)

N69-27602# Joint Publications Research Service, Washington, D.C.

METHODS AND SOME OF THE RESULTS OF AUTOCORRELATION AND SPECTRAL ANALYSIS OF CARDIAC RHYTHM

R. M. Bayevskiy et al *In its Appl. of Computer Technol. in Med.* 21 May 1969 p 1-12 refs (See N69-27601 15-05)

Avail: CFSTI

Two recently proposed methods for investigating cardiac rhythm are discussed, with attention being focused on the role of extracardial regulators in determining the correlations within a dynamic series of values for the duration of a cardiac cycle. In particular, the sinus node combined with the sympathetic and vagus nerves and corresponding nerve centers is considered as a single functional system, in which control commands circulate and input commands can enter from higher levels of regulation (cerebral cortex, hypothalamus, etc.). The tabulated results obtained from examination of ten young people at rest and during minor activity are included, from which it was concluded that the proposed methods may be an important ancillary tool in cardiological examination. In addition, it appeared that in a number of cases, where it is difficult to gather the necessary information, these methods may enable effective medical monitoring of an individual's condition.

A.C.R.

N69-27603# Joint Publications Research Service, Washington, D.C.

USE OF MULTIDIMENSIONAL REGRESSION ANALYSIS IN PREDICTING THE QUALITY OF FLIGHT TRAINING

Ye. I. Garber et al *In its Appl. of Computer Technol. in Med.* 21 May 1969 p 13-19 refs (See N69-27601 15-05)

Avail: CFSTI

Computer techniques for solving complex problems in nosological diagnostics and diagnostics of states, where the weight of a given symptom or set of symptoms must be determined by processing the primary material, are described. A study was conducted using multidimensional regression analysis for a specific instance involving the diagnostics of states, in which data from laboratory, psychological, and physiological examinations were analyzed to determine the psychophysiological qualifications of the subjects for entrance into flight training. The approach used in the study presupposed that the relation between laboratory findings and actual flight training achievement can be approximated in a linear ratio, and the satisfactory prognostic results verified the supposition. It was concluded, however, that a special study was required to determine how often linear approximation of data is applicable to other similar clinical investigations.

A.C.R.

N69-27670# Joint Publications Research Service, Washington, D.C.

SOVIET POLAR STUDIES

31 Mar. 1969 26 p refs Transl. into ENGLISH from Russian Rept.

(JPRS-47746) Avail: CFSTI

CONTENTS:

1. SOME PROBLEMS OF MEDICAL SUPPLY OF ANTARCTIC EXPEDITIONS N. R. Deryapa et al p 1-11 (See N69-27671 15-04)

2. SOVIET MEDICAL RESEARCH IN THE ANTARCTIC I. V. Shastin, p 12-16 refs (See N69-27672 15-04)

3. CONCERNING MEDICAL SELECTION OF MEN FOR ARCTIC AND ANTARCTIC EXPEDITIONS A. L. Matusov p 17-24 refs (See N69-27673 15-04)

N69-27671# Joint Publications Research Service, Washington, D.C.

SOME PROBLEMS OF MEDICAL SUPPLY OF ANTARCTIC EXPEDITIONS

N. R. Deryapa et al

In its Soviet Polar Studies 31 Mar. 1969 p 1-11 refs Transl. into ENGLISH from Antarktika (USSR), 1965 p 121-128 (See N69-27670 15-04)

Avail: CFSTI

Medical problems encountered on Soviet Antarctic expeditions are summarized based on literature data and personal experience gained in investigating the acclimatization of polar explorers in this region and the therapeutic and prophylactic services furnished them. These studies revealed the existence of severe climatic conditions which frequently exceed the corresponding situation in the Arctic. Numerous body functional changes were also observed in the process of Antarctic acclimatization; and many subjective disturbances, generally characterized by complaints of not feeling well, were reported particularly in middle aged and older people. The general physical condition, however, usually remained good, although the incidence of disease among polar explorers is higher in the Antarctic than on other continents and should be considered in close association with the process of acclimatization. It was concluded that the medical care of polar explorers should be of a pronounced preventive nature, and a detailed list of recommendations is included.

A.C.R.

N69-27672# Joint Publications Research Service, Washington, D.C.

SOVIET MEDICAL RESEARCH IN THE ANTARCTIC

I. V. Shastin *In its Soviet Polar Studies* 31 Mar. 1969 p 12-16 refs Transl. into ENGLISH from Antarktika (USSR), 1965 p 129-132 (See N69-27670 15-04)

Avail: CFSTI

Research carried out by staff doctors at the Soviet expeditionary stations in the Antarctic is summarized as to the psychological, physiological, and psychophysiological effects of acclimatization. It was found that in most of the persons examined the acclimatization process gave rise to neurasthenic symptoms, and that under adverse meteorological conditions minor physical effort caused shortness of breath and tachycardia. Detailed research was conducted during the period 1956-1962, with particular emphasis on neurotic disturbances, incidence of internal disease, electrocardiographic irregularities, and wound healing processes. Of particular interest were the changing responses of explorers to the Antarctic environment at various stages of the acclimatization process and as a result of variations in daily outdoor exposure time.

A.C.R.

N69-27673# Joint Publications Research Service, Washington, D.C.

CONCERNING MEDICAL SELECTION OF MEN FOR ARCTIC AND ANTARCTIC EXPEDITIONS

A. L. Matusov *In its Soviet Polar Studies* 31 Mar. 1969 p 17-24 refs Transl. into ENGLISH from Problemy Arktiki i Antarkiki (Leningrad), No. 26 1967 p 71-76 (See N69-27670 15-04)

Avail: CFSTI

A brief summary of Soviet selection criteria for polar explorers from the earliest expeditions of the nineteenth century to the recent era is presented, as well as recommendations for primary factors which should be taken into account in preparing a set of instructions and a list of medical contraindications for persons assigned to such missions. These factors include: (1) the extreme natural and climatic conditions of the polar regions and their effect on the human organism; (2) the occupation of polar explorers and the nature of the work to be accomplished; and (3) the age of a prospective expedition member and whether or not he is a new applicant or an experienced worker. It is also emphasized that the various locations and physical facilities of the expeditionary stations should be considered when evaluating the natural and climatic influences. Specific recommendations are also outlined for the complexity of the medical examinations and the types of medical personnel who are to perform the tests.

A.C.R.

N69-27736# Deutsche Versuchsanstalt für Luft- und Raumfahrt, Munich (West Germany). Institut fuer Flugmedizin.

THE PSYCHOMOTOR PERFORMANCE AFTER APPLICATION OF ANALGETICS AND ANAESTHETICS IN THERAPEUTIC DOSES UNDER THE ASPECT OF TRAFFIC MEDICINE [DIE VERAENDERUNG DER PSYCHOMOTORISCHEN LEISTUNGSBEREITSCHAFT BE ANWENDUNG VON ANALGETIKA UND ANAESTHETIKA IN THERAPEUTISCH WIRKSAMEN DOSEN UNTER VERKEHRSMEDIZINISCHER SICHT]

M. Lass, (Ph.D. Thesis--Bonn Univ.) Mar. 1969 47 p refs In GERMAN; ENGLISH summary (DLR-FB-69-10; DVL-829) Avail: CFSTI

Magnitude and duration of the psychomotor performance decrement caused by some analgetic, anesthetic, and narcotic drugs (applied orally, gaseous or by injection) were measured in 12 young healthy persons and compared with the effect of ethylalcohol. The results allow the conclusion that a person's ability to actively take part in traffic is impaired at least for several hours by the tested pharmaceutical substances.

Author

N69-27747# Deutsche Versuchsanstalt für Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.

EFFECTS OF THE FLIGHT STRESS TO SOME CELLENZYME-ACTIVITIES IN THE BLOOD OF PILOTS OF THE STARFIGHTER F 104 G [AUSWIRKUNGEN DER FLIEGERISCHEN BELASTUNG AUF EINIGE ENZYMAKTIVITAETEN IM BLUT BEI PILOTEN DES STARFIGHTERS F 104 G]

D. Finger (Ph.D. Thesis--Bonn Univ.) Mar. 1969 52 p refs In GERMAN; ENGLISH summary (DLR-FB-69-14; DVL-830) Avail: CFSTI

The behaviour of cell enzyme-activities in the blood of pilots trained for the plane of the type F 104 G was tested and the results were compared with those of exercise training, lack of O₂, coldness and heat, vibration and acceleration. As a result there could be found correlation between the extent of the stress reaction and the stress intensity.

Author

N69-27781*# California Inst. of Tech., Pasadena. W. M. Keck Lab. of Environmental Health Engineering.

INVESTIGATION OF BIOCHEMICAL STABILIZATION OF AQUEOUS SOLUTIONS OF ORGANIC COMPOUNDS BY UNSATURATED FLOW THROUGH POROUS MEDIA Final Report, 1965-1968

Jan. 1969 127 p refs

(Grant NGR-05-002-036)

(NASA-CR-101280) Avail: CFSTI CSCL 06A

This study concerns the oxidation of nitrogenous and carbonaceous organic matter in urine by intermittent percolation through porous media. An objective of the study was to investigate the process for possible application in the reclamation of water from urine in space vehicles or at lunar stations. The characteristics of wastewaters in space vehicles were identified, including quantities, quality requirements, and the properties of natural and synthetic urines. Aerobic decomposition by means of hydrolysis, nitrification of ammonia, and removal of carbonaceous matter and phosphates are described. Laboratory and field experiments were conducted with sand columns and columns of activated carbon and CaCO₃. Results are presented regarding the various mechanisms of biochemical stabilization of urine and observations of urea hydrolysis, ammonification of nitrogenous compounds, ion absorption and oxidation in various media, maintenance of aerobic environments, and nitrogen production.

K.W.

N69-27792# National Research Council of Canada, Ottawa (Ontario).

DEFINITIONS OF THE DOSE EQUIVALENT, THE REM AND THE VALUATION FACTOR [DIE DEFINITIONEN DES DOSISAEQUIVALENTS, DER EINHEIT REM UND DES BEWERTUNGSFAKTORS]

H. Berger et al 1969 9 p refs Transl. into ENGLISH from Strahlentherapie (Munich), vol. 131, no. 1, 1966 p 143-149 (NRC-TT-1361) Avail: CFSTI

The dose equivalent D_q is the product of the absorbed dose D and a valuation factor q , determined by mutual agreement and characterizing the risk from the different types of radiation in radiation protection work. The rem, originally proposed as roentgen equivalent man, serves for stating dose equivalents instead of the rad, but is identical to the absorbed dose unit rad. Till now these terms have not been closely defined. In the meantime, however, they have found general acceptance and it is necessary to have them approved as a standard. Author

N69-27866# Commissariat à l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucléaires.

RADIO-SENSITIZATION OF ANIMALS BY BISMUTH [RADIOSENSIBILISATION DE L'ANIMAL PAR LE BISMUTH]

Théodore Pierotti and André Verain 1969 21 p In FRENCH; ENGLISH summary

(CEA-R-3689) Avail: CFSTI

Digestive absorption of bismuth by animals leads to radio-sensitization and this effect is very marked when the X-rays used are centered on the absorption line of bismuth. Experiments were carried out on more than 2,000 C3H/JAX mice, and showed that a maximum lethal effect, with respect to the standard, occurs for bismuth subnitrate doses of the order of 3 g/kg and for exposures of 700 R. For stronger or weaker doses, the sensitization effect is less marked. Author (ESRO)

N69-27913*# California Univ., Los Angeles.

A MINIATURIZED TELEMETRY DEVICE FOR THE TRANSMISSION OF THE ELECTRICAL ACTIVITY OF SINGLE NERVE CELLS IN THE BRAIN

James G. McElligott, John R. Zweizig, and Raymond T. Kado [1968] 13 p refs

(Grant NGL-05-007-195)

(NASA-CR-101403) Avail: CFSTI CSCL 06B

A telemeter is described by which the activity of individual nerve cells in the awake and unrestrained animal can be transmitted. The unit, directly incorporated into the electrode connector plug on the animal's head, possesses a high input impedance and a broad bandwidth. It is constructed inexpensively from readily available stock components and is designed to operate in the FM broadcast band. Author

N69-28024*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

SIMULATION OF GEMINI EXTRAVEHICULAR TASKS BY NEUTRAL-BUOYANCY TECHNIQUES

Otto F. Trout, Jr., Gary P. Beasley, and Donald L. Jacobs (NASA Manned Spacecraft Center) Washington Jun. 1969 92 p refs (NASA-TN-D-5235) Avail: CFSTI CSCL 05E

Neutral-buoyancy simulation techniques were applied to investigate experimentally the astronaut's extravehicular tasks in the Gemini flight program. The preflight hardware, procedures, modes of performance, and data developed during the neutral-buoyancy tests are described and compared with those pertaining to the extravehicular activities in the Gemini flights. Continuing development of the simulation during this investigation showed that the techniques are useful in assessing procedures and supporting hardware, obtaining a reasonable estimate of the subject's energy expenditure, and developing realistic time lines in training the astronaut for the extravehicular tasks in space. Author

N69-28037# National Research Council of Canada, Ottawa (Ontario).

DOSIMETRIC CHARACTERISTICS OF INCORPORATED MESOTHORIUM-228 (CALCULATION MODEL AND REFERENCE CURVES) [DOZIMETRICHESKIE KHARACTERISTIKI IN KORPORIROVANNOGO MEZOTORIYA-228 (MODEL RASCHETA I SPRAVOCHNYE GRAFIKI)]

V. M. Malykhin et al 1969 22 p refs Transl. into ENGLISH from Gos. Kom. po Ispol'z At. Energii SSSR (Moscow), 1967 (NRC-TT-1355) Avail: CFSTI

This report gives a complete method of analytically and numerically determining the dosimetric characteristics of $M\text{Th}^{228}$ - $R\text{dTh}^{228}$. It describes the method of determining the accumulation and retention levels of mesothorium-228 after a limited uptake period at a constant average daily uptake, the dynamics of removal with excreta and the accumulation of the biological dose. An evaluation was made of the feasibility of direct and indirect methods of tissue dosimetry of $M\text{Th}^{228}$ - $R\text{dTh}^{228}$ link. Aspects of establishing maximum permissible uptake levels are discussed. Author

N69-28051# Israel Program For Scientific Translations, Ltd., Jerusalem.

HYGIENE EFFECTS AND CONTROL OF DUSTS, FOGS, GASES, VAPOURS, AND RADIOACTIVE PARTICLES

1968 49 p refs Transl. into ENGLISH from Staub (Duesseldorf), v. 28, no. 8, Aug. 1968 Supported by HEW (IPST-5308) Copyright. Avail: In US solely from CFSTI Order No. TT-68-50448/8; outside US solely from VDI-Verlag GmbH, 4 Duesseldorf 1 Post Box 1139, West Germany

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1. SIZE SPECTROSCOPY OF RADIOACTIVE AEROSOLS BY MEANS OF ELECTROSTATIC PRECIPITATION D. Petrusch et al p 1-6 refs (See N69-28052 15-06)

2. INVESTIGATIONS AT β -DECAY CURVES OF FISSION PRODUCT AEROSOLS WITH CONSIDERATION OF FRACTIONATION EFFECTS D. Paffreth et al p 7-15 refs (See N69-28053 15-24)

3. PARTICLE SIZE SPECTROMETRY OF AEROSOLS BY LIGHT SCATTERING IN A LASER BEAM W. Jacobi et al p 15-22 refs (See N69-28054 15-14)

4. LEAD DEPOSITION IN NORMAL HUMAN LUNGS H. J. Einbrodt p 22-25 refs

5. CALCULATING THE PARTICLE SIZE DISTRIBUTION OF A DUST BY MEANS OF FRACTIONAL SEPARATION EFFICIENCY CURVES AND TOTAL EFFICIENCY CURVES p 25-28 ref (See N69-28055 15-14)

6. MEASURING THE CONCENTRATIONS OF ORGANIC SUBSTANCE IN WASTE GASES BY ABSORPTION AND INFRARED SPECTROMETRY L. Grupinski p 28-30 refs (See N69-28056 15-06)

N69-28071

N69-28071*# Systems Technology, Inc., Hawthorne, Calif.
EXPERIMENTS AND A MODEL FOR PILOT DYNAMICS WITH VISUAL AND MOTION INPUTS

Robert L. Stapleford, Richard A. Peters, and Fred R. Alex
Washington NASA May 1969 126 p refs
(Contract NAS2-3650)

(NASA-CR-1325; TR-168-2) Avail: CFSTI CSCL05H

This report describes the results of a simulator program to investigate the effects of motion cues on a manual-control tracking task. The experimental variables were controlled-elements dynamics, linear motion characteristics, and angular motion characteristics. The data obtained include: pilot describing functions, both overall (combined visual and motion feed-backs) and separate (independent visual and motion pathways); remnant characteristics; and tracking performance. These data are also compared with previous experimental results. A multimodality pilot model for both visual and motion feedbacks is derived. The dynamics of the two (angular and linear) motion feedback paths and the integration of visual and motion feedbacks are discussed. The implications of the experimental data and the multimodality pilot model on the design requirements for moving-base simulators are also reviewed.

Author

N69-28080 National Lending Library For Science and Technology, Boston Spa (England).

USE OF THERMOLUMINESCENT ALUMINOPHOSPHATE GLASSES FOR A PERSONNEL NEUTRON DOSIMETER [ISPOLZOVANIE TERMOLUMINESTSI RUYUSHCHIKH ALYUMOFOSFATNYKH STEKOL DLYA INDIVIDUALNOGO DOZIMETRA NEITRONOV]

I. A. Bochvar et al Feb. 1969 15 p refs Transl. into ENGLISH of Simpozium po Neitronnoi Dozimetr. Dlya Radiol. Zashchity Paper SM-76/48 (Vienna), 29 Aug.-2 Sep. 1966
(NLL-RTS-3877) Avail: Natl. Lending Library, Boston Spa, Engl.: £1 17s 6d

The thermoluminescent effect of activated lithium containing aluminum phosphate glasses was evaluated for possible mixed gamma-neutron beam detection as personnel neutron dosimeter. It was found that this glass can be used as thermoluminescence dosimeter for monitoring radiation dose equivalents of mixed gamma neutron beams over a wide energy range.

G.G.

N69-28093*# Research Triangle Inst., Durham, N.C.
BIOMEDICAL APPLICATIONS OF NASA SCIENCE AND TECHNOLOGY Quarterly Progress Report, 15 Dec. 1968 - 14 Mar. 1969

14 Mar. 1969 101 p refs
(Contract NSR-34-004-056)

(NASA-CR-101399; RTI-EU-411; QPR-3) Avail: CFSTI CSCL 06B

During the reporting period the NASA-supported Biomedical Application Team identified 15 new problems, performed significant activities on 10 of the active problems identified previously, performed 5 computer searches of the NASA aerospace literature, and maintained 3 current awareness searches. Significant transfers of technology included adaptation of the spray-on electrode technique to two new applications, an implantable fluid pressure sensor for cranial measurements, indicator-dilution techniques for blood dynamics studies, and a cardiac R-wave detector for use in electrocardiogram analysis.

Author

N69-28098*# Indiana Univ., Bloomington. Div. of Optometry.
AN ANALYSIS OF SOME REFRACTIVE ERROR TRENDS IN U. S. AIR FORCE PILOTS AND NAVIGATORS

Irving L. Dunskey and John R. Levene Jun. 1969 73 p refs
(Contract NAS9-8078)

(NASA-CR-99667) Avail: CFSTI CSCL06E

An analysis of the refractive powers of the horizontal and vertical meridians of the eye with age on 153 pilots and 55 navigators of the United States Air Force indicated (1) Very low regression coefficients and correlations between age and meridional refractive powers for the two groups are found. (2) Meridional powers of refractive error in the right and left eyes of pilots showed a paired relationship. The same paired relationship also exists between the right and left eyes of navigators. (3) The mean meridional refractive powers (right and left eyes) of pilots and navigators are significantly different from each other. This indicated that the two samples came from two different populations.

Author

N69-28099*# Westinghouse Electric Corp., Pittsburgh, Pa.
SOLID ELECTROLYTE SYSTEM FOR OXYGEN REGENERATION

L. Elikan and J. P. Morris Washington NASA Jun. 1969 180 p refs

(Contract NAS1-7306)

(NASA-CR-1359) Avail: CFSTI CSCL05E

High efficiency multi-cell batteries employing $(ZrO_2)_{0.9}(Y_2O_3)_{0.1}$ electrolyte were constructed and operated for periods exceeding 100 days. Three five-cell batteries were life-tested; their lives were 152, 112, and 77 days. A continuous carbon deposition reactor in which the CO in the $CO-CO_2-H_2-H_2O$ mixture produced by electrolysis was decomposed to form solid C and CO_2 , was operated for 100 days without interruption and without decline in catalyst activity. Over 60% conversion was obtained throughout the test. The carbon produced was dry, free flowing, and non-clogging. Palladium foils were found to be an effective means of removing H_2 from a CO, CO_2, H_2, H_2O mixture. Operated $800^\circ C$ and above, no carbon deposition was observed on the foil. Based on the performance of the multi-cell electrolysis battery, carbon deposition reactor, and palladium foils tested, it is estimated that a solid electrolyte oxygen system can be built for a 4-man, 100-day mission which will weigh 121 pounds and require 1160 watts of power.

Author

N69-28103# Joint Publications Research Service, Washington, D.C.

SOVIET POLAR STUDIES

12 Mar. 1969 28 p refs Transl. into ENGLISH from various Russian publications

(JPRS-47626) Avail: CFSTI

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1. SOME PROBLEMS OF MAN'S ACCLIMATIZATION IN THE ANTARCTIC A. L. Matusov p 1-9 refs (See N69-28104 15-04)

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3. PULMONARY VENTILATION AT REST IN PERSONNEL WINTERING AT ANTARCTIC STATIONS V. N. Ponomarev p 13-19 (See N69-28106 15-04)

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N69-28104# Joint Publications Research Service, Washington, D.C.

SOME PROBLEMS OF MAN'S ACCLIMATIZATION IN THE ANTARCTIC

A. L. Matusov *In its Soviet Polar Studies* 12 Mar. 1969 p 1-9 refs Transl. into ENGLISH from Byul. Sov. Antarkt. Ekspeditsii (Moscow), no. 65, 1967 p 142-149 (See N69-28103 15-04)

Avail: CFSTI

Human acclimatization to Antarctic conditions together with variations in the functional state of the required life-support systems induce organic changes that can be a prerequisite for the formation of pathological states and the development of illnesses. Pathological changes foremost observed during Antarctic expeditions are: (1) diseases of the teeth and the oral cavity (20.8%); (2) traumas (16.3%); (3) diseases of the peripheral nervous system (15.0%); (4) neuroses (7.8%); and (5) acute purulent and other skin diseases (6.7%). These five nosological forms account for 66.6% of the total number of referrals of polar workers for medical assistance. Numerous studies of acclimatization processes project the biological adaptation of the human body; however, toward the end of wintering signs of exhaustion of adaptation reserves appear.

G.G.

N69-28106# Joint Publications Research Service, Washington, D.C.

PULMONARY VENTILATION AT REST IN PERSONNEL WINTERING AT ANTARCTIC STATIONS

V. N. Ponomarev *In its Soviet Polar Studies* 12 Mar. 1969 p 13-19 refs Transl. into ENGLISH from Byul. Sov. Antarkt. Ekspeditsii (Moscow), no. 69, 1968 p 55-62 (See N69-28103 15-04)

Avail: CFSTI

Human lung ventilation capacity under Antarctic conditions increases corresponding to the greater severity of the physico-geographic environment. The required gas exchange is sustained as basic indexes increase and new metabolic levels are formed in the process of man's adaptation to the icy environment. Upon return to customary climatic conditions, the basal metabolic level decreases again and pulmonary ventilation is reduced.

G.G.

N69-28107# Joint Publications Research Service, Washington, D.C.

MAN'S ACCLIMATIZATION IN THE ANTARCTIC

G. M. Danishevskiy et al *In its Soviet Polar Studies* 12 Mar. 1969 p 20-34 refs Transl. into ENGLISH from the book "Osnovnyye Itogi Izucheniya Antarktiki za 10 Let" Moscow, Izd. AN SSSR, 1967 p 147-158 (See N69-28103 15-04)

Avail: CFSTI

Systematic studies of human acclimatization under Antarctic conditions show a dependence on the various geographic areas. Somatic dystrophy and cardiovascular insufficiency are found most frequently in the central mountain region; greater liability in human adaptation reactions with dysadaptation-type metoneuroses appear in Antarctic coastal workers. Both groups lose their immunity to many strains of microorganisms not present in the camps so that during annual replacements epidemic outbreaks of grippetype illnesses occur. Since gradual acclimatization to harsh conditions proves advantageous, it is recommended that winterers arriving by aircraft undergo a two week adaptation in the coastal region before being sent to interior stations.

G.G.

N69-28177 California Univ., Los Angeles.

WORK PHYSIOLOGY: A PHYSIOLOGICAL EVALUATION OF TIME STANDARDS AND WORK-REST DESIGN FOR MODERATE TO STRENUOUS WORK

Nicholas Joseph Aquilano (Ph.D. Thesis) 1968 200 p

Avail: Univ. Microfilms: HC \$9.00/Microfilm \$3.00 Order No. 68-16508

The major purposes of this study were: (1) to investigate the adequacy of conventional industrial engineering methods for setting time standards when applied to moderate or strenuous type work; (2) to reexamine the work-rest method in work design as oppose to continuous performance at a slower pace for the same level of output; (3) to investigate the feasibility of applying the relationships derived from a physical fitness type test (a bicycle ergometer in this case) to estimate energy expended during the performance of a different type task. Experiments were designed wherein experienced workers performed carton handling tasks while heart rate and oxygen consumption were measured. Heart rates and EKG were continuously monitored through the direct couple of surface electrodes to a Beckman-Offner Dynagraph. Energy expenditure was measured by open-circuit calorimetry using respirometers and a oxygen analyzer. Six tasks consisting of lifting cartons of two weights at three heights were selected.

Dissert. Abstr.

N69-28180*# Hawaii Univ., Honolulu. Botany Dept.

ROLE OF GRAVITATIONAL STRESS IN LAND PLANT EVOLUTION: THE GRAVITATIONAL FACTOR IN LIGNIFICATION Semiannual Report

S. M. Siegel May 1969 31 p *Its Botan. Sci. Paper No. 9*

(Grant NGR-12-001-053)

(NASA-CR-101449) Avail: CFSTI

In accord with the hypothesis that the role of gravito-mechanical factors in lignification require a broad biological support as well as direct hypogravity simulation, the biology of lignification is pursued in the study of its determinants. Observations concerning the nature of habitat are reported, and the presence of flavenoid pigments is discussed. The association of gigantism and hyperlignification is considered, with data indicating a facultative relation between lignin and mechanical stress. Studies on mangrove seedlings indicate that a variety of physical and chemical treatments leading to lignification of young seedlings may be reasonably explained on the basis of increased membrane permeability, or even wholesale removal of membranes involved in specific compartments. Statistical experimental data are also presented concerning the lignification and growth response of cucumber seedlings to hypergravity, as well as further studies concerning the effects of two weeks clinostat hypogravity on growth and lignification in cucumber seedling roots and hypocotyls.

P.A.B.

N69-28241*# California Univ., Los Angeles.

PHYSIOLOGY OF CHIMPANZEES IN ORBIT Progress Report, Oct-Dec. 1968

Dec. 1968 12 p

(Grant NSR-05-007-158)

(NASA-CR-101447; AAP-PMH-69-5) Avail: CFSTI CSCL 06C

Couch restrained, catheterized and unrestrained, uncatheterized male chimpanzees were studied in simulated spacecraft orbiting environments. The sleep/wake cycle, 24-hour urinary metabolites and excretion analysis on food deprivation, and hormonal patterns were recorded. Matching successive sample discrimination (MSSD) training, visuo-motor tracking, and adaptation to the prototype spherical chamber are also described.

M.H.E.

N69-28297

N69-28297# Defense Documentation Center, Alexandria, Va
**ACCELERATION TOLERANCE, VOLUME 1. REPORT
BIBLIOGRAPHY, DEC. 1945-FEB. 1968**

Feb. 1969 132 p refs

(AD-684450; DDC-TAS-68-81) Avail: CFSTI CSCL 6/19

The tolerance for acceleration has been studied by experimentation on the centrifuge using human and animal subjects. Body positioning relative to the direction of the increased gravitational forces was found to be critical. In an upright position, the gravitational shifts of blood may leave the brain cells without adequate blood and oxygen supply causing grayout or blackout at 4 to 6g. This annotated bibliography compiles 99 unclassified and unlimited references of documents that have been cataloged in the DDC collection. Author (TAB)

N69-28300# Flugmedizinisches Institut der Luftwaffe, Fuerstenfeldbruck (West Germany).

**ACTIVITY REPORT, LISTINGS OF SCIENTIFIC WORKS
AND PRESENTATIONS OF 1968 [TAETIGKEITSBERICHT,
VERZEICHNIS DER WISSENSCHAFTLICHEN ARBEITEN
UND VORTRAEGE DES JAHRES 1968]**

1968 54 p refs In GERMAN

Avail: CFSTI

Medical studies during the year centered in the field of flight stresses. Other studies were conducted on the relationship between flight medicine and the exact natural sciences, simulation models, flight psychology, and clinical biology. Activities of the sections for human engineering, aircraft accidents, laboratory analysis, biotelemetry, ballistocardiography, and electrocardiography are reported. Summaries are also presented on library activities, documentation, and medical instrumentation. All scientific works published during the year and participation in professional meetings are listed. Transl. by K.W.

N69-28352# Library of Congress, Washington, D.C. Aerospace Technology Div.

**ELECTROSLEEP (CEREBRAL ELECTROTHERAPY) AND
ELECTROANESTHESIA: THE INTERNATIONAL EFFORT AT
EVALUATION**

F. M. Wageneder (Graz, Univ., Austria), A. Iwanovsky, and C. H. Dodge (Naval Observatory, Washington) *In its Foreign Sci. Bull.*, Vol. 5, No. 4 Apr. 1969 p 1-104 refs (See N69-28351 15-34)

Avail: CFSTI

This review reflects the efforts of the international biomedical and bioengineering communities to critically approach and quantitatively evaluate electrosleep and electroanesthesia, and to improve the understanding of the physiological mechanisms of these electroneural techniques. Author

N69-28481*# Michigan Univ., Ann Arbor. Research Center for Group Dynamics.

**THE DEVELOPMENT OF METHODS FOR THE EARLY
IDENTIFICATION OF HEART DISEASE AND RELATED JOB
STRESSES Progress Report, 1 Mar.-30 Jun. 1969**

John R. P. French, Jr. 30 Jun. 1968 34 p refs

(Grant NGR-23-005-185)

(NASA-CR-101490) Avail: CFSTI CSCL 06S

A study is described which has as its purpose the investigation of the risk factors of heart disease found in specific occupations.

in terms of the person-environment fit. Information is sought on the nature of the interactive relationships between overload conditions of the work environment, psychological and physiological reactions to those conditions, and the personality traits of the individual. Three occupational groups comprise the target groups of the study: administrators, scientists, and engineers; volunteers will be used to donate blood samples and other physiological data and fill out a questionnaire on their work environment. The variables which are to be measured include subjective quantitative and qualitative overload, objective quantitative workload, career history, personality, physiology, non-occupational health-related behaviors, and other data. The study procedure to be followed is described. P.A.B.

N69-28485*# Wyle Labs., Inc., Huntsville, Ala. Research Div.
**ANALYSIS OF POTENTIAL COMMUNITY RESPONSE TO
TEST OPERATIONS OF ROCKETDYNE/SANTA SUSANA
FACILITY**

L. C. Sutherland Aug. 1968 24 p refs

(Contract NAS8-21260)

(NASA-CR-98475; TM-68-11) Avail: CFSTI CSCL 05H

An analysis was carried out on the anticipated impact of noise levels, generated by a rocket engine test facility, on potential inhabitants of neighboring land tracts. Essential background and prediction data showed that no structural damage to residences was expected. Significant portions of the subject property were in reaction zones ranging from threats of community action to actual vigorous community reaction. Predicted responses were based on data extrapolation from static firing tests conducted at locations with reasonably flat terrain. Author

N69-28500# Technische Hochschule Hannover (West Germany).
**STUDIES ON THE ENERGY DEPENDENCE OF THE
BIOLOGICAL EFFECT OF FAST NEUTRONS
[UNTERSUCHUNGEN ZUR ENERGIEABHANGIGKEIT DER
BIOLOGISCHEN WIRKUNG SCHNELLER NEUTRONEN]**

Hans Jurgen Hamann (Ph.D. Thesis) 1968 95 p refs In GERMAN

Avail: CFSTI

The effects of monoenergetic neutron irradiation of 3.4 and 14.7 MeV were studied on a number of plants. The neutrons were produced in a cascade accelerator using the reactions D(d,n)He 3 and T(d,n)He 4. Seeds of barley (*Hordeum vulgare*) and horse beans (*Vicia faba*) as well as spores of the mold fungus *Aspergillus niger* and of the moss *Funaria hygrometrica* were irradiated. For comparison, the objects were also exposed to gamma rays of Cs 137 and Co 60. The following effects were studied: (1) shortening of the germination, seedling, and chromosome aberration rate in the root tips of barley; (2) main root shortening of *Vicia faba*; and (3) survival rate and viability of the spores. Transl. by K.W.

N69-28519*# Midwest Research Inst., Kansas City, Mo.
**BIOMEDICAL APPLICATIONS OF AEROSPACE
GENERATED TECHNOLOGY, TASK 1 Final Report, 1 Jun.
1968-31 May 1969**

David Bendersky, Wilbur E. Goll, and Donald E. Roberson 31 May 1969 144 p refs

(Contract NSR-26-002-083)

(NASA-CR-101446) CSCL 06B

During the period, 70 biomedical problems were submitted by five medical institutions. As a result, technology which appears

to be applicable to the solution of 30 biomedical problems was identified. The identified technology was successfully used by the biomedical researchers in 10 cases, and there are 20 potential transfers of technology which are in various stages of evaluation.
Author

N69-28534# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MONOGRAPHS ON SPACE PHYSIOLOGY

V. V. Parin et al 18 Nov. 1968 115 p refs Transl. into ENGLISH of the publ. "Ocherki po Kosmicheskoi Fiziologii" Moscow Izd. Meditsina, 1967 p 1-135
(AD-684602; FTD-MT-24-338-68) Avail: CFSTI CSCL 6/19

Space physiology is a new scientific direction, intimately connected with the practice of the medico-biological preservation of the safety of space flights. A separate chapter is dedicated to the methods of physiological investigations in flight. It points out the broad use of biotelemetry for transmitting data about the state of the astronaut from on board the ship to earth. A number of specific methods developed for registering physiological functions in flight is described. Numerous data obtained in the performance of flying experiments with animals and during space flights of man are examined in the light of the existing theoretical concepts about regulation of functions in the living organism. Moreover, both the classical ideas as well as the new conceptions connected with ideas of cybernetics are employed. In this book much space is allotted to the problem of vestibulo-vegetative reactions, the motion-sickness syndrome. It is shown that these phenomena must be examined as an overall reaction of the organism, caused by the disturbance of the interconnection of the afferent systems. In the concluding chapter the prospects are examined for the development of space physiology, included in which are problems of lunar and interplanetary flights, problems of biocontrol and of the further development of the methods of investigation.
Author (TAB)

N69-28543# Kansas State Univ., Manhattan. Inst. for Systems Design and Optimization.

SIMULATION AND FEASIBILITY STUDY OF A THERMAL COMFORT EQUATION

E. S. Lee, L. T. Fan, C. L. Hwang, and M. A. Shaikh Jan. 1968 39 p refs
(Contract F44620-68-C-0020)
(AD-684744; ISDO-3) Avail: CFSTI CSCL 6/11

A basic problem in the study of life support systems is to establish conditions under which human beings feel thermally comfortable. Since the condition for thermal comfort is influenced by various factors in a complex manner, a general equation for thermal comfort is very difficult to establish. In this work the feasibility region of the comfort equation of Fanger is studied by simulation. One of the purposes of this study is to illustrate how the systems techniques can be used to analyze complex models. Another purpose is to study the behavior of this equation so that it can be used as one of the constraints for the optimization studies of life support systems.
Author (TAB)

N69-28546# Kansas State Univ., Manhattan. Dept. of Industrial Engineering.

A COOLING HOOD IN HOT HUMID ENVIRONMENTS

Stephan A. Konz and H. Fritz Nentwich
Jan. 1969 42 p refs /ts Spec. Rept. No. 81
(Contract F44620-68-C-0020); Proj. Themis
(AD-684582, AFOSR-69-0574TR) Avail: CFSTI CSCL 06/17

This paper describes cooling man with conduction: specifically, cool water in tubes of a hood on the head. The results can be summarized as follows: head temperature was kept considerably lower and skin and rectal temperatures were kept lower; cardiac cost was reduced; sweating was at approximately 40% of the rate without the hood, and permitted exposure time to heat stress was longer.
Author (TAB)

N69-28593*# Sandia Corp., Albuquerque, N.Mex.

CONTAMINATION CONTROL HANDBOOK

Feb. 1969 314 p refs Supported by AEC
(NASA Order H-13245A)
(NASA-CR-61264) Avail: CFSTI CSCL 05E

Technical information and data on contamination control are assembled and include the following topics: contamination control in product design, gases, and liquids; and microbial, airborne, and surface contamination control. Sections are also presented on radiation, clean packaging, and maintaining product and personnel cleanliness.
B.P.

N69-28595# Human Engineering Labs., Aberdeen Proving Ground, Md.

PRELIMINARY INVESTIGATION FOR DEVELOPMENT OF AN ELECTRONIC PSYCHOMOTOR SKILL TESTER OF V/STOL PILOTS

Orest Zubal Dec. 1968 37 p refs
(AD-684304; HEL-TN-12-68) Avail: CFSTI CSCL 5/10

This is a report from a program of studies of V/STOL handling qualities. Simple electronic equipment was used to assess psychomotor capabilities. The task provided a zero-input compensatory rate-tracking test with variable system sensitivity. Two groups of ten subjects each were placed on different schedules for training and testing. The integrated absolute-error scores suggested that the rate-tracking task had face validity and discriminated reliably among subjects. Preliminary indications were that the test was insensitive to flight time.
Author (TAB)

N69-28599# Central Electricity Generating Board, Berkeley (England). Nuclear Labs.

DOSE ARISING FROM INHALATION OF NOBLE GASES

J. T. Whitton Dec. 1968 15 p refs
(RD/B/N-1274) Avail: CFSTI

Dose distributions in a person exposed to a cloud of noble gas are affected by the presence of the gas in the blood stream after inhalation. The diffusion and solubility coefficients of various noble gases in the body were estimated from the biological literature and used to calculate the gonad dose from inhalation of ⁸⁵Kr. It is shown that this is only 1% of that from the gammas and bremsstrahlung from external irradiation, which in turn is only 1% of the skin dose. Simple considerations show that no seriously larger corrections are needed for the other radioactive noble gases.
Author (NSA)

N69-28637# Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.

NONDESTRUCTIVE ANALYSIS OF MAJOR COMPONENTS OF PLANT MATERIALS BY MEANS OF 14-MeV NEUTRONS [ANALYSE NON DESTRUCTRICE DES PRINCIPAUX CONSTITUANTS DE LA MATIERE VEGETALE APRES IRRADIATION AUX NEUTRONS DE 14 MeV]

N69-28642

Jean-Pierre Garrec Nov. 1968 30 p refs In FRENCH
(CEA-R-3636) Avail: AEC Depository Libraries

Small electrostatic accelerators, which generate fast neutrons of 14-MeV energy, are used for directing a deuteron beam at 150 KeV onto a tritiated target. The resulting flux of monoenergetic neutrons attain 5×10^{11} n/sec in 4π geometry by the $^3\text{H}(d,n)^4\text{He}$ reaction. Numerous elements found in plant material can be activated in this flux, mainly by (n,p) , (n,α) , and $(n,2n)$ reactions. Current research is directed towards making use of the entire gamma spectrum of activated plant matter. A computer is used to break down the spectrum into seven main spectral regions by the least-squares method. As a first approximation, these regions are those obtained from aluminum, calcium, potassium, magnesium, phosphorus, silicon, and chlorine standards in standard activation and radioactive decay conditions. Radioactivation with 14-MeV neutrons is particularly well adapted to quick and simultaneous determination of useful elements in agronomy. Author (NSA)

N69-28642*# Public Health Service, Cincinnati, Ohio. Research and Technology Branch.

ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS Quarterly Progress Report, 1 Jan.-31 Mar. 1969

R. B. Read, Jr. Apr. 1969 19 p

(NASA Order R-36-015-001)

(NASA-CR-101471; QPR-16) Avail: CFSTI CSCL 06C

Moisture effects on spore heat resistance are investigated, and parameters governing water uptake and loss from spores were studied. Efforts were concentrated on (1) determination of spore moisture content during various phases of spore preparation process, (2) determination of moisture content of the can-matrix system used during heat resistance determinations, (3) effect of moisture in the environment on spore water content, (4) influence of moisture on the thermal destruction of *Bacillus subtilis* var. *niger*, and (5) effect of spore lyophilizates on the z_D of *Bacillus subtilis* var. *niger*. Author

N69-28726*# Southwest Research Inst., San Antonio, Tex.

SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM Cumulative Quarterly Report, 1 Apr.-30 Jun. 1968

Ray W. Ware, Louis S. Berger, and Felix L. St. Claire, III 15 Jul. 1968 93 p refs

(Contract NASw-1714; SwRI Proj. No. 14-2329)

(NASA-CR-101383) Avail: CFSTI CSCL 06B

Updated data are presented on the various activities conducted by the biomedical applications team. A status summary of the biomedical problems considered, along with the transfers effected, is presented. Attention is also directed to problems which are still under consideration and to new problems presented to the institute for action. B.P.

N69-28848# Navy Experimental Diving Unit., Washington, D.C.
FORTAN 4 COMPUTER PROGRAMS TO FACILITATE ANALYSIS AND CALCULATION OF DECOMPRESSION SCHEDULES

T. E. Berghage 1 Jun. 1968 54 p refs

(AD-680604; NEDU-RR-4-68) Avail: CFSTI CSCL 6/19

Four Fortran 4 computer programs designed to calculate and analyze decompression profiles are described. All four computer programs are based upon the haldane decompression model as presented by Workman. Additional theoretical considerations and supportive data are outlined in an attempt to modernize the present model for use on surface dives to great depths. Author (TAB)

N69-28853# Army Medical Research Lab., Fort Knox, Ky. Experimental Psychology Div.

A COMPARISON OF PRIMARY AND SECONDARY OPTOKINETIC NYSTAGMUS IN CAT AND MAN

James W. Wolfe Oct. 1968 16 p refs

(AD-684346; USAMRL-796) Avail: CFSTI CSCL 6/16

Optokinetic responses from 20 cats and 20 human subjects were compared under two different experimental conditions. Data indicate that cat and man possess completely different optokinetic responses: (1) cats show a well developed secondary optokinetic response, while humans do not; (2) humans show a directional preponderance in primary optokinetic nystagmus not found in cat; (3) marked adaptation of the primary optokinetic response was also characteristic of the human subjects. Author (TAB)

N69-28921 National Lending Library for Science and Technology, Boston Spa (England).

METHYLATION OF DNA AND ITS BIOLOGICAL SIGNIFICANCE [METILIROVANIE DNK I EGO BIOLOGICHESKOE ZNACHENIE]

B. F. Vanyushin Mar. 1969 47 p refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 65, no. 2, 1968 p 163-185 (NLL-RTS-4991) Avail: Natl. Lending Library, Boston Spa, Engl.: 40s

An extensive literature survey of the methylated components of nucleic acids, specifically DNA, was carried out with a view to establishing the origin of these minor bases. The DNA usually has two forms of subsidiary methylated bases: 5-methylcytosine and 6-methylaminopurine. The positions of these minor bases in the nucleotide sequence of DNA were examined for various animals and higher plants. It was concluded that methylation is a specific modification of nucleic acids. This modification of the DNA in the cell is effected by particular enzymes, DNA methylases, having pronounced specificity with regard to species and strains. The presence, nature, and character of distribution of minor methylated bases in DNA of various origins are additional specific features of the genetic material of the cell and may have a definite taxonomic significance. DNA methylation was found to play a special part in conjugation and recombination in the case of microorganisms and the reproduction of phages and viruses. It may have a definite significance in the regulation of the activity of genes, in the replication of DNA, senescence, mutagenesis, and carcinogenesis. B.P.

N69-28924# Georgetown Univ., Washington, D.C. Dept. of Biology.

THE PERFORMANCE OF SMALL MAMMALS AT LOW BODY TEMPERATURES Final Report, 1 Sep. 1964-31 Dec. 1968

Joseph Allan Panuska Feb. 1969 36 p refs

(Contract DA-49-193-MD-2668)

(AD-684477) Avail: CFSTI CSCL 6/3

The occurrence of performance failure as a temperature dependent phenomenon in hypothermia was studied in six species of

mammals: the rat, guinea pig, chinchilla, mouse, gerbil, and hamster. The performance suppression temperature of the hamster was higher and more variable than was noted in nonhibernating species. Trained performance, therefore, stubbornly persists through a large depression in body temperature. Nevertheless, it is a temperature-dependent phenomenon, with suppression occurring in a nonlinear fashion. Trained performance stops within narrow body temperature ranges for individuals of the same species performing the same task, and within a wider but still narrow range for the six species studied. The report also contains brief summaries of research on blood pressure, heart rate, fractional distribution of cardiac output to the brain, righting reflexes, and spontaneous locomotor activity during progressive hypothermia in the unanesthetized rat. In addition, the report summarizes studies on the effect of Dimethylsulfoxide on cooling rates, oxygen consumption, behavioral temperature regulation, heart rate, and cardiac arrest during progressive hypothermia in unanesthetized small mammals. The distribution of Dimethylsulfoxide in the tissues of the unanesthetized hypothermic rat is also discussed.

Author (TAB)

N69-28955# Liege Univ. (Belgium).

MEASUREMENT OF INFRARED SPECTRA AND CHEMICAL BONDING OF INORGANIC COMPOUNDS Final Scientific Report, 1 Jan. 1966-31 Aug. 1968

Pierre C. Tarte and Pierre-Andre Flamee Oct. 1968 99 p refs (Contract AF 61(052)-917)

(AD-684135; AFCRL-69-0033) Avail: CFSTI CSCL 7/4

Infra-red absorption spectra of selected families of inorganic solid compounds have been registered and discussed. The following types of compounds have been investigated: (1) Compounds with, or related to, the MgO (NaCl) structure. The spectrum, which is very simple for compounds with the true NaCl structure, is more complicated for LiX(III)O₂ compounds; in this latter type of compounds, the study of 6Li - 7Li isotopic shifts shows that the low-frequency band (in the 300 - 200/cm region) must be assigned to a vibration of LiO₆ octahedra, whereas the 600 - 400/cm absorption is essentially related to vibrations of the X(III)O₆ octahedra. (2) Lithium compounds of various types. In this case, a systematic investigation of 6Li - 7Li isotopic frequency shifts demonstrates the occurrence of various (weak to very strong) types of vibrational interactions. (3) Compounds with the BaSO₄ structure. Three problems have been investigated: the occurrence of frequency shifts in the spectrum of BaSO₄ in relation with the methods of synthesis; the IR pattern of compounds of this type for different cations and anions; the IR spectrum of solid solutions.

Author (TAB)

N69-28956# Emory Univ., Atlanta, Ga.

COMPOSITIONAL CHANGES OF ECOSYSTEM SEGMENTS DURING CHRONIC GAMMA IRRADIATION

Arthur R. Garrett, Jr. (Ph.D. Thesis) 1968 144 p refs (Contract AT(40-1)-2412)

(ORO-2412-18) Avail: CFSTI

A series of observations were made on segments of granite outcrop ecosystems during chronic gamma irradiation. Samples were taken on ten dates during a 14-month period. Dose rates covered the interval from 161 to 0.1 R/hr for total doses ranging between 1356 and 0.8 kR. Samples of vegetation, litter arthropods and soil nematodes were quantitatively studied. The number of nematodes generally declined with increasing irradiation. The values of the index of similarity and 10 diversity indexes for the vegetation

and litter arthropods are presented as annual progressions or in terms of their regression on radiation exposure and time. Similarity considerations seem more informative regarding vegetation changes. Diversity indexes seem more appropriate to describing changes in litter arthropod samples. The indexes are useful as concise descriptive statements of change in taxonomic composition of ecosystems.

Author (NSA)

N69-28966# Army Biological Labs., Fort Detrick, Md.

MICROBIOLOGICAL METHODS OF TESTING THE ATMOSPHERE

A. Yu. Vershigora Jul. 1968 135 p refs Transl. into ENGLISH of the book "Metody Mikrobiologichnykh Doslidzen Povitrya" Kiev, 1960 133 p

(AD-680423; Trans-557) Avail: CFSTI CSCL 6/13

The book presents brief information on bacterial aerosols and methods of conducting experiments with them. It contains exact descriptions of new instruments used for bacteriological testing of the atmosphere, methods of using them and evaluating instruments that are widely applied in practice. A succinct exposition is given of the basic rules employed in the methodology of bacteriological testing of the air in closed spaces as well as outdoors.

Author (TAB)

N69-28978# Army Natick Labs., Mass. Food Lab.

GROWTH OF PLANT CELL CULTURES. PART 3: GROWTH KINETICS AND MASS CULTURE

Mary Mandels, Robert O. Matthern and Hamed M. El-Bisi Sep. 1968 41 p refs

(AD-684610; FL-80; TR-69-22-FL) Avail: CFSTI CSCL 6/3

Suspension cultures of bean and lettuce cells have been maintained by serial transfer for over three years. Such cultures may show exponential growth, although growth rates are low with doubling times of three to four days. These suspension cultures have also been grown in commercial laboratory fermenters in batch and semi-continuous systems for period of up to 61 days without contamination. Productivity in fermenters was up to 2.3 grams dry weight of cells per liter of culture per day. Cell yields are up to 40% based in the weight of sucrose in the medium.

Author (TAB)

N69-29056# Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.

THE PERCEPTION OF PITCH IN A WHITE NOISE MASK

Alan N. Richards 10 Oct. 1968 16 p refs

(AD-684775; SMRL-548) Avail: CFSTI CSCL 5/10

The mel scale, relating subjective pitch in mels to physical frequency in cycles per second, is now commonly found in texts and handbooks in engineering psychology. It is usually derived from the psychophysical method known as bisection, in which the listener adjusts a variable frequency to sound half as high in pitch as a standard tone. The average subject will not, for example, adjust the variable to 500 for a standard of 1000 cycles per second. In this study mel scales were derived from fractionation data when the standard and variable tones were presented in each of three background noise conditions. The scale for tones in quiet differed in no essential manner from the generally accepted mel scale advanced by Stevens in 1940; however, upon the introduction of a wide-band masking noise, the shape of the mel function became more positively accelerated. In general, when holding the intensity

N69-29057

of the masker constant, this acceleration is inversely related to the sensation of the masker constant, this acceleration is inversely related to the sensation level of the experimental tones above masked threshold, and is not frequency dependent. Although the relationship is not dependent upon frequency per se, the magnitude of pitch shift increases with frequency. Author (TAB)

N69-29057# Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.

AUDITORY FEEDBACK AND HELIUM-SPEECH Interim Report

James Willott (Conn. Coll.) and Russell L. Sergeant 18 Sep. 1968
12 p refs

(AD-684773; SMRL-544) Avail: CFSTI CSCL 17/2

Acoustic and intelligibility analyses were made of speech from five talkers breathing air or an HeO₂ mixture, when their speech was or was not masked by loud noise of 95 decibels sound pressure level re .0002 microbar. Mean intelligibility scores were determined from responses by 26 listeners for both air and helium conditions when noise interfered with a talkers ability to hear his own speech. The average long-term power spectra of speech in air and speech in the helium-mix did not differ to an appreciable degree as had been expected. However, sound spectrograms for the helium-speech revealed upward frequency shifts as typically reported. But neither the average spectra nor the spectrograms of helium-speech and speech in air showed significant differences between talking in noise versus talking in quiet. It is concluded that alterations made to improve intelligibility while speaking in loud noise are not closely related to the acoustic variations analyzed in this investigation. Author (TAB)

N69-29058# Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.

THE THRESHOLD OF THE STAPEDIUS REFLEX TO SELECTED ACOUSTIC STIMULI IN NORMAL HUMAN EARS

Lawrence J. Deutsch 24 Sep. 1968 34 p
(AD-684774; SMRL-546) Avail: CFSTI CSCL 6/16

The threshold sound pressure levels for the middle-ear stapedius muscle reflex in response to white noise (constant spectrum level), and to pure tones and narrow bands of noise in the regions of 2 and 4 kilocycles per second, were studied with the Zwislocki acoustic impedance bridge and an objective recording method. Means and the shape of the distributions were provided. Mean thresholds for noise were as low as 62 decibels above audiometric threshold. Reliability and stability were high. It was concluded that the method could be used for a variety of purposes in audiometry, clinical audiology, and physiological acoustics; and for such purposes this paper provides normative data from 30 normal-hearing young men. Author (TAB)

N69-29073 Vanderbilt Univ., Nashville, Tenn.

THE HUMAN CONTROLLER WITH PREVIEWED INPUTS

Leonard Estes Joseph Maginn (Ph. D. Thesis) 1968 83 p
Avail: Univ. Microfilms: HC \$4.40/Microfilm \$3.00 Order No. 68-17983

The results are reported of experiments conducted with human controllers when the subject could see the input in the

future. For this case, the controller can prepare, in advance, for a response, and it is likely that his characteristics may be describable in terms of an optimal control system. The experiments were designed to test certain aspects of such a description. The experiments are described, and the results are tabulated and/or graphed. One series of experiments was conducted to determine the ability of the controller to predict accurately the proper time to make a response. It was concluded that the human controller tends to respond very near the proper time but not too accurately. For these experiments the controller required approximately one-half second to make this prediction. A second series of experiments was conducted to determine the ability of the controller to change his performance as required by different scoring criteria. Dissert. Abstr.

N69-29100# Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.

THE INTELLIGIBILITY OF HELIUM-SPEECH AS A FUNCTION OF SPEECH-TO-NOISE RADIO Interim Report

Russell L. Sergeant and Christine L. McKay (Conn. Coll.) 31 Oct. 1968 12 p refs

(AD-684777; SMRL-555) Avail: CFSTI CSCL 17/2

Three experiments compared the intelligibilities of helium-speech and normal speech masked by loud noise. Recordings were made of 5 talkers reading intelligibility word lists. Several panels of listeners heard these recordings masked by different levels of background noise. In Experiment 1, a fatigue effect seemed at first to be present differentially for the helium-speech, suggesting that short-term auditory fatigue may occur with helium. However, Experiment 2, designed to observe the effect on intelligibility of time during listening session that material was heard, refuted the notion of short-term fatigue effects. Experiment 3 incorporated results of the first two experiments to evaluate the effect of introducing varied levels of noise upon intelligibility of helium-speech and normal speech when order of presentation of gas mix was minimized. Author (TAB)

N69-29119# Commissariat a l'Energie Atomique, Fontenay-aux-Roses (France). Centre d'Etudes Nucleaires.

EFFECTS OF RADIATION ON THE URINARY EXCRETION OF FREE AMINO ACIDS IN THE RABBIT [EFFETS DE L'IRRADIATION SUR L'EXCRETION URINAIRE DES AMINO-ACIDES LIBRES DU LAPIN]

C. Valle, J. C. Huet, and G. Marble [1968 13 p In FRENCH Presented at the 1st European Congr. on Radiation Protection and Exhibition on Equipments Using Low Energy and Short Range Radiation Dosimetry, Menton, France, Oct. 1968 (CEA-CONF-1172; CONF-681013-12) Avail: AEC Depository Libraries

The results obtained in the study of the urinary excretion of free amino acids in rabbits exposed to 400, 600, 800, and 1000 rads of γ radiation from a ⁶⁰Co source were reported. Some results present analogies with those observed during accidental human irradiation. It is difficult to draw dose-effect relations of the results from this first study. Author (NSA)

N69-29147# Army Research Inst. of Environmental Medicine, Natick, Mass.

BIOMEDICINE PROBLEMS OF HIGH TERRESTRIAL ELEVATIONS

A. H. Hegnauer Jan. 1969 172 p refs Symp. held at Army Res. Inst. of Environ. Med. Natick, Mass., 16-17 Oct. 1967 (AD-682731; USARIEM-TR-68-50) Avail: CFSTI CSCL 6/16

The symposium was concerned with (a) the effects of climatic extremes upon the human subject and his performance, (b) mechanisms of acclimatization, and (c) providing the information required for the development of means for protection with minimal decrement of performance. This symposium was therefore organized to present extant knowledge of the biomedical problems engendered by the hypoxia of high terrestrial altitudes. Central to the purpose was the thought that by means of such presentation and discussion, not only would the present 'state of the art' be summarized, but also that the gaps in present knowledge would appear in bolder relief, thus revealing the most promising and profitable directions for future research.

. Author (TAB)

N69-29174# Ohio State Univ., Columbus. Human Performance Center.

SOME PRINCIPLES FOR DESIGN OF DECISION SYSTEMS: A REVIEW OF THE FINAL PHASE OF RESEARCH ON A COMMAND-CONTROL SYSTEM SIMULATION Final Report. 1 Sep. 1966-31 Mar. 1968

William C. Howell and Charles F. Gettys Wright-Patterson AFB, Ohio AMRL Nov. 1968 54 p refs (Contract AF 33(615)-2248)

(AD-684548; AMRL-TR-68-158) Avail: CFSTI CSCL 5/5

The chief objective of the present research was to anticipate a number of issues which would arise if an automated aid to decision making were actually implemented. Questions asked included: (1) What happens to system performance if probabilistic information is reduced to an all-or-none form at some point in processing. (2) Can a hierarchical (specialist-nonspecialist) system use limited resources effectively to gather predictive data. (3) Can a system in which aggregation of predictive information is automated benefit from a manual supplement (to handle unanticipated data). Results summarized in the nine principles suggest that (1) all-none transformation of probabilistic data can seriously degrade system performance, especially if system response is in any way dependent upon likelihood of alternative states (but there are several important exceptions to this rule); (2) potential deficiencies in allocation of resources by the system should be guarded against in future system designs; (3) an automated aggregation design can be enhanced by a manual supplement to deal with unanticipated data; (4) a voice communication capability does not offset system performance deficit attributable to degradation of other processing modes; and (5) the value of experience in certain aspects of human decision performance may not extend far beyond the specific conditions under which the experience was acquired.

Author (TAB)

N69-29195# National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

A PROCESS FOR IMPRINTING MICRO LAGOON FIELDS IN PLASTIC SURFACES FOR USE IN CELL AND TISSUE CULTURE

Clarence D. Cone, Jr. and Edward N. Fleenor, Jr. Washington Jun. 1969 33 p refs

(NASA-TN-D-5255) Avail: CFSTI CSCL 06C

The process involved the fabrication of a metal impression die possessing a raised image anvil of the micro lagoon field on

its surface, and the impressment of the heated die into the surface of suitable plastic vessels. Details of the die fabrication process are given, including the techniques used for photo transference of the basic lagoon-field image to the metal die surface and the development of the anvil imprint image on the die surface by chemical etching. The process used for imprinting the lagoon-field image into the plastic culturing surfaces of various culture vessel types is also described. Photomicrographs of typical lagoon fields formed by the process are presented, along with an analysis of factors in the die-fabrication process which affect the dimensional accuracy of the resulting lagoons. Time-lapse studies of actual cell growth in lagoons produced by the impression process, using L-strain fibroblasts, indicate that the lagoons are of excellent optical quality and are very effective in preventing both the escape of cells from the lagoons and the intrusion of external cells into the lagoons.

Author

N69-29259# Techtran Corp., Glen Burnie, Md.

EXPERIMENTALLY PRODUCED MICROCEPHALY IN CAUDATA [UBER EXPERIMENTELL ERZEUGTE MIKROKEPHALIE BEI URODELEN]

Gian Tondury Washington NASA May 1969 35 p refs Transl. into ENGLISH from Arch. Entwicklungsmech. Organ. (Germany), v. 136, 1937 p 529-562

(Contract NASw-1695)

(NASA-TT-F-12154) Avail: CFSTI CSCL 06C

Experiments were performed on *Triton alpestris*, *taeniatus* and *Amblystoma mexicanum* with the intent of answering the following questions: (1) Is it possible to create defects in the foregut and foregut tegmen by performing defect operations in the area of the blastopore pit? (2) How do such defects effect head development? (3) Is formation of a normal head with a brain and sense organs only dependent on the nature and extent of the underlying head mesoderm, or does it develop as a function of the development of a normal foregut, or do both of these, underlay and foregut, work together as head organizers? The defect operation along with removal of the dorsal-lateral, and ventral parts, resulted in a clear reduction of small celled mesodermal foregut tegmen material in 55% of all embryos. As a result of these post-operatively developed defects, embryos were developed which had defective head anlagen in 80% of all cases and normal head anlagen in 20%.

Author

N69-29272# Techtran Corp., Glen Burnie, Md.

CONSTRICTION AND SECTION EXPERIMENTS WITH ANURAN EMBRYOS [SCHNURUNGS- UND DURCHSCHNEIDUNGSVERSUCHE AM ANURENKEIM]

G. A. Schmidt Washington NASA May 1969 50 p refs Transl. into ENGLISH of Arch. Entwicklungsmech. Organ. (Germany), v. 129, 1935 p 1-44

(Contract NASw-1695)

(NASA-TT-F-12153) Avail: CFSTI CSCL 06C

Constriction and section experiments were designed to show that, in anurans just as in urodels, the gastrula is still capable of making extensive adjustments and that it is not yet finally and irrevocably determined in its parts. Strong constrictions of anuran embryos at different stages of their development resulted in double formations, normal, well proportioned twins, or deformed though whole formations. After the neural plate has developed, the embryo is finally determined in its parts and constrictions produce only semi-formations. Experimental results are also affected by the constriction angle. Section experiments produced the same results.

Author

N69-29289*# Ohio State Univ. Research Foundation, Columbus, Ohio. Acarology Lab
DETERMINATION OF MINIMUM CONCENTRATIONS OF ENVIRONMENTAL WATER CAPABLE OF SUPPORTING LIFE Semiannual Report, 1 Nov. 1968-30 Apr. 1969
 G. W. Wharton 10 Jun. 1969 93 p refs
 (Grant NGR-36-008-015; RF Proj. 1858)
 (NASA-CR-101567; Rept-10) Avail CFSTI CSCL 06C

As part of the continuing work on this project, a systematic analysis was made of the exchange of water between a mite *Laelaps echidnina* and the surrounding vapor. The water exchange rates were determined from observations of the water mass and tritium content of the mite following a step change in the environmental water balance parameters. The resulting change in water content was shown to be a first order rate process according to the theory of surface limited diffusion from solids. This model was further developed to relate the observed tritium content and specific activity to the total transpiration of water from the body fluids and the total sorption of water from vapor, respectively. The components of water exchange were hypothesized to include bulk flow, metabolic production and loss, diffusion, and the little understood active transport pump. The variations of permeability of the water exchange barrier were tentatively associated with the diffusion through the tracheal system. Author

N69-29347*# Stanford Univ., Calif. Biomechanics Lab
TRANSMISSION CHARACTERISTICS OF DISTENSION, TORSION AND AXIAL WAVES IN ARTERIES
 William E. Moritz (Ph.D. Thesis) May 1969 90 p refs
 (Grant NGR-05-020-223)
 (NASA-CR-101582; SUDAAR-373) Avail: CFSTI CSCL 06P

Experiments were conducted using anesthetized, mature, male mongrels of unknown age, weighing between 20 and 40 kg and lying in a supine position. Complex Fourier analysis and the interference of wave reflections were eliminated by the use of small amplitude, finite trains of sine waves. The induced wall displacements were monitored by a pair of electro-optical tracking units equipped with a lens system that allowed for a resolution of 2×10^{-4} cm. Wave transmission data were also acquired on the effect of varying the arterial pressure, the initial stretch and the surrounding medium of the vessel, together with the signal amplitude. The results indicate that the artificial pressure wave is non-dispersive with a speed of about 11 m/sec, while the torsion and axial waves are mildly dispersive with speeds of 15-24 and 25-35 m/sec, respectively, for frequencies from 20 to 100 Hz. A discrepancy indicative of anisotropic wall behavior was evident between the experimental results and those predicted by an isolated isotropic model. A.C.R.

N69-29360 Oklahoma Univ., Norman.
THE EFFECTS OF NOISE, AIR IONS, AND ELECTRIC FIELDS ON LIVING SYSTEMS
 Adil M. Mayyasi (Ph.D. Thesis) 1968 167 p
 Avail: Univ. Microfilms: HC \$7.80/Microfilm \$3.00 Order No. 68-17593

Experimental animals (400 King-Holtzman hybrid breed of rats, 200 males half young and half adult and 200 females half young and half adult) were subjected to three environmental conditions: noise, negative air ions, and positive direct electric fields. This study consisted of two experiments, one of which involved exposing rats to two levels of noise and three levels of negative air ion concentrations. The other experiment involved exposing rats to two levels of noise and three levels of electric field intensity variations. The data collected consisted of the time and error scores

(average value of 10 trials for each rat) of rats running a modified Lashley left-right maze with an escape from water motive. A randomized-complete-block-design with repeated measures was selected for statistical treatment by analysis of variance. In the cases where significant interaction terms appeared with significant main effects an additional statistic (Newman-Keuls) was used to facilitate interpretation of the main effects. Dissert. Abstr.

N69-29372*# Texas Woman's Univ. Research Inst., Denton. Nelda Childers Stark Lab. for Human Nutrition Research.
THE EFFECT OF SPACE FLIGHT ON BONE DEMINERALIZATION
 Pauline Beery Mack May 1969 159 p refs
 (Contract NAS9-3687)
 (NASA-CR-99696) Avail: CFSTI CSCL 06P

Experiment M-6 was designed to determine the extent of bone mass loss experienced during space flight and the rate of recovery of bone mass postflight. The method used in these investigations consisted of radiographic bone densitometry, with the crew members of Gemini flights 4, 5, and 7 serving as subjects. Calibrated and standardized radiographs were made at various times both preflight and postflight. By radiographing anatomical sites with a limited amount of soft tissue, the X-ray image of the bone was maximized. The radiographs were analyzed by a special analog computer to determine X-ray absorbcency; the data were reported in terms of changes in X-ray equivalent calibration wedge mass which could be converted to changes in calcium hydroxyapatite, the chief component of skeletal mineral. Decreases in X-ray absorbcency indicated a decrease in bone mass; increases indicated bone mass recovery. Author

N69-29435# American Inst. for Research, Pittsburgh, Pa.
DEVELOPMENT OF A TAXONOMY OF HUMAN PERFORMANCE: A REVIEW OF THE FIRST YEAR'S PROGRESS
 Edwin A. Fleishman, Robert G. Kinkade, and Armand N. Chambers
 Nov. 1968 59 p
 (Contract F44620-67-C-0116; ARPA Order 1032)
 (AD-684583; AFOSR-69-0657TR; AIR-726-11/68-TPR1; TPR-1)
 Avail: CFSTI CSCL 5/10

The report briefly describes technical progress during the first year of a five year project to develop and verify a taxonomic system for the classification of human task performance. During this initial year, the major efforts on the project proceeded along four lines of activity: (1) review of previous taxonomic efforts, (2) development of an integrative model, (3) development of provisional classification schemes, and (4) development of a human performance data base. Previous taxonomic efforts were reviewed to provide guidelines and suggest approaches for the development of classification systems. An integrative model was developed to indicate which areas had to be taken into account in the development of a comprehensive task taxonomy. A provisional classification scheme, based on human abilities identified in earlier correlational studies, was developed to indicate the feasibility of using such an approach and to isolate some of the practical problems that might be encountered in the development of a taxonomy. Work on another provisional classification scheme, based on observable characteristics of tasks, has been initiated. The requirements of a human performance data base were defined to provide a resource and a research tool for testing provisional classification systems being developed. Author (TAB)

N69-29448# Oregon Univ., Eugene.

CHARACTERISTICS OF MATRIX TASKS EMPLOYED IN TASK-DIRECTED LEARNING

Fred R. Fosmire, Forrest L. Brissey, and Carolin S. Keutzer May 1968 31 p refs

(Grant AF-AFOSR-1055-66)

(AD-684585; AFOSR-69-0607TR) Avail: CFSTI CSCL 5/10

A general purpose of Task-Directed Learning (TDL) is to provide opportunities for participants in decision-making groups to learn something about the nature of complex interpersonal processes. A closely related objective is that the participants acquire a higher level of competence in the management of interpersonal relations. A key assumption in the TDL program is that the effectiveness of the group will increase as the individuals gain knowledge about group process and grow in interpersonal competence. For long-term working arrangements, there seem to be two separate and necessary components of group effectiveness: (1) technical competence in achieving the solution to the problem confronting the group at the outset, and (2) social reinforcement for members who participate in group decision-making.

Author (TAB)

N69-29466 Stanford Univ., Calif.

EFFECTS OF VISCOSITY AND EXTERNAL CONSTRAINTS ON WAVE TRANSMISSION IN BLOOD VESSELS

Everett Jones (Ph.D. Thesis) 1968 157 p

Avail: Univ. Microfilms: HC \$7.40/Microfilm \$3.00 Order No. 69-237

The propagation of sounds and pulse waves within the cardiovascular system is subject to strong dissipative mechanisms. To investigate the effects of viscosity on dissipation as well as dispersion of small pressure signals in arteries and veins a parametric study was carried out. A linearized analysis of pressure waves in a cylindrical membrane that contains a viscous fluid and whose wall is isotropically viscoelastic indicates that there are two families of axisymmetric waves: a family of slow waves and one of fast waves. It is shown that the faster waves are more sensitive to variations in the elastic properties of the medium surrounding the blood vessels. At high Reynolds numbers the attenuation due to fluid viscosity over a fixed length is found to be substantially greater for the fast waves than for the slow waves. At very low Reynolds numbers the effects of attenuation are reversed.

Dissert. Abstr.

N69-29582# Army Aeromedical Research Unit, Fort Rucker, Ala.
AN EVALUATION OF OPHTHALMIC PLASTIC (CR-39) LENSES IN THE US ARMY AVIATION ENVIRONMENT

John K. Crosley, Robert W. Bailey, and Frank H. Fischer Feb. 1969 24 p refs

(AD-684371; USAARL-69-3) Avail: CFSTI CSCL 17/8

Thirty rated U. S. Army aviators with various types of refractive errors were selected to wear-test both clear and tinted plastic (CR-39) ophthalmic lenses for a period of six months. Subjective evaluations were made in the areas of impact resistance, scratch resistance, weight, optical clarity, comfort, cleaning ease, resistance to breakage, and accumulation of foreign material. User acceptance was quite good. Lens scratching was not found to be a significant problem.

TAB

N69-29609# Army Biological Labs., Fort Detrick, Md.

APPLICATION OF THE HIGH-FREQUENCY ELECTRICAL CONDUCTIVITY METHOD FOR THE STUDY OF ADSORPTION PROPERTIES OF IRRADIATED PROTEINS

V. K. Trach et al 1969 9 p refs Transl. into ENGLISH from Russian publ.

(AD-685402; Trans-2411) Avail: CFSTI CSCL 6/18

The method devised by the author makes it possible to estimate the adsorptive properties of proteins by determining the temperature coefficients of the high-frequency electrical conductivity of their solutions.

Author (TAB)

N69-29610# Kobe Univ. (Japan). Dept. of Physiology.

STUDIES OF THE MAMMALIAN BRAIN FUNCTION IN VITRO Annual Report, 3 Sep. 1967-Sep. 1968

Isamu Suda San Francisco Army Research and Develop. Group (Far East) 23 Jan. 1969 15 p

(Grant DA-CRD-AG-S92-544-67-G52)

(AD-684957; J-293-4) Avail: CFSTI CSCL 6/16

Viability of the frozen cat brain at -60C was studied by electrocorticograms, spontaneous single nerve cell discharges, light and electronmicroscopic examination. The brain which had been perfused with 4% dextran Hanks solution in situ was isolated and cryoprotective agent was added in the perfusate. Thereafter it was frozen slowly and stored at -60C for 28 days.

Author (TAB)

N69-29612# Shuford-Massengill Corp., Lexington, Mass.

ITEM ANALYSIS BASED ON CONFIDENCE RESPONSES

Emir H. Shuford, Jr. and H. Edward Massengill Mar. 1969 49 p refs

(Contract F44620-69-C-0068; ARPA Order 833)

(AD-685182; SMC-R-17; AFOSR-69-0408TR) Avail: CFSTI CSCL 5/10

In examining the behavior of a group of subjects with respect to one test item, a distribution of confidence is obtained for each answer to the item. Empirical confidence distributions are analyzed for the responses of 98 students to 16 four-alternative items. Techniques are derived for computing both a difficulty index and a validity index from confidence data. Two graphical techniques are devised and applied to 16 items to indicate the ability of these items to discriminate between the better and poorer students. One graphical technique compares the confidence distributions for each of the possible answers for the upper and lower subjects while the other technique compares the frequency of occurrence of various states of knowledge in the upper and lower groups.

Author (TAB)

N69-29613# Oregon State Univ., Corvallis.

INORGANIC FLUORIDE PROPELLANT OXIDIZERS. VOLUME 2: EFFECTS UPON MICROORGANISMS, FISH, AND PLANTS Final Report, 15 May 1966-30 Jun. 1967

Frank N. Dost, D. J. Reed, and C. H. Wang Wright-Patterson AFB, Ohio AMRL Nov. 1968 71 p refs

(Contract AF 33(615)-1767)

(AD-684176; AMRL-TR-66-187-Vol-2) Avail: CFSTI CSCL 6/20

The effects of the inorganic fluoride oxidizing agents, chlorine trifluoride, chlorine pentafluoride, bromine pentafluoride, oxygen difluoride, nitrogen trifluoride, and tetrafluorohydrazine, upon selected species of microorganisms, fish, and plants were studied. In acute

exposures of less than 1 hour, the interhalogens, as gases, are destructive to plants at atmospheric concentrations of 10-30 ppm, and in aqueous solution, are lethal to fish and microorganisms at concentrations of 10-25 micrograms fluoride per milliliter. The latter effects result from formation of inorganic acids and various oxidizing species, either of which are lethal alone and which can be neutralized by basic compounds and reducing agents, and by filtration through soil. Oxygen difluoride is toxic to plants at concentrations in air as low as 1.5 ppm over a 30-minute exposure period, but has no effect upon aquatic species. Nitrogen trifluoride and tetrafluorohydrazine are nearly innocuous to nonmammalian organisms. Author (TAB)

N69-29619*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

DIRECT DETERMINATION OF DISTENSIBILITY OF THE LEFT VENTRICLE OF THE HEART UNDER IN VIVO CONDITIONS

William J. Astleford Mar. 1969 54 p
(Grant NGR-05-020-223)

(NASA-CR-101581; SU-DAAR-372) Avail: CFSTI CSCL 06P

An attempt was made to obtain quantitative information on the effective material properties of the in vivo canine cardiac muscle through distensibility measurements. In addition the frequency spectra of intravascularly recorded heart sounds were obtained. As part of a systematic effort to evaluate the accuracy of various possible mathematical models, a number of animal experiments were devised which should allow for a more direct determination of the heart's mechanical behavior. The governing equations and boundary conditions pertaining to the distensibility of the left ventricle are given. The ventricle is assumed to behave like a thick-walled spherical shell. Surgical preparations, instrumentation, and data acquisition and reduction used in the measurements are explained. These direct measurements of the distensibility established that the material properties of the left ventricular wall vary with the phase of the cardiac cycle and are frequency dependent within the ejection phase of systole. K.W.

N69-29627# School of Aerospace Medicine, Brooks AFB, Tex.
RESPONSE OF NORMAL MAN TO GRADED EXERCISE IN PROGRESSIVE ELEVATIONS OF CARBON DIOXIDE, 18 Jul.-24 Sep. 1967

Stuart J. Menn, Richard D. Sinclair, and B. E. Welch Dec. 1968 23 p refs

(AD-685271; SAM-TR-68-116) Avail: CFSTI CSCL 6/19

Trained volunteers performed steady-state moderate exercise (one-half of maximum $\dot{V}O_2$) and heavy exercise (two-thirds of maximum $\dot{V}O_2$) in 0, 8, 15, 21, and 30 mm. Hg $PICO_2$ for 30 minutes on a bicycle ergometer. At CO_2 levels of 8 and 15 mm. Hg, no difficulty was encountered by the subjects. The higher levels of hypercapnia caused some respiratory symptoms of air-hunger and intercostal muscle pain, but were of mild enough degree to permit all subjects to complete the exercise. Incremental exercise up to workloads producing maximum $\dot{V}O_2$ was also performed. The tolerance at maximum exercise in 21 mm. Hg $PICO_2$ resembled that at two-thirds workload in 30 mm. Hg $PICO_2$. VE during maximum exercise did not vary with the level of inspired CO_2 , whereas at submaximal workloads, VE increased as $PICO_2$ increased. At two-thirds and maximum workloads, $\dot{V}CO_2$ during exercise fell progressively with increasing $PICO_2$. The ineffective CO_2 removal is explained by the decreased alveolar-inspired CO_2 gradient with increasing $PICO_2$. Inadequate elimination of CO_2 caused respiratory acidosis to be superimposed on the metabolic acidosis normally present during exercise. Author (TAB)

N69-29644*# Baylor Univ., Houston, Tex. Coll. of Medicine.

EVALUATION OF MATERIALS PROPOSED FOR USE IN SPACE FLIGHT Final Report

W. Christopher Duncan and John M. Knox [1967] 3 p refs
(Contract NAS9-8109)

(NASA-CR-101731) Avail: CFSTI CSCL 05/E

The primary irritancy and allergenicity of a flame proof paper proposed for use in space flight were evaluated in skin tests on animals and human volunteers. Guinea pigs were used in the animal tests. The test method is briefly described. The paper was found to be free of irritant and allergic potentials. K.W.

N69-29646# Virginia Univ., Charlottesville. School of Engineering and Applied Sciences.

LEARNING CONTROL SYSTEMS AND PATTERN RECOGNITION Semiannual Progress Report, 15 Mar.-15 Sep. 1968

J. W. Moore, E. S. McVey, B. J. Gilpin, P. F. Chen, E. J. White et al Feb. 1969 307 p refs

(Contract DAAB07-68-C-0066)

(AD-684325; ECOM-0066-2; SAPR-2) Avail: CFSTI CSCL 6/4

Topics covered include finite state sequential machines, thin film deposition research, construction of chip matrix receptors, neural networks of the retina, phototransistor response testing, position and velocity detection systems, and character recognition. A feasibility study of the theory and design of position and velocity detecting systems using pattern recognition concepts is presented. Design parameters of the systems receptor are considered. The results indicate that the required size of the receptor matrix is relatively large for available solid state receptors. Methods of receptor resolution improvement through input signal perturbation are presented. The results indicate that an order of magnitude improvement in position detection accuracy can be obtained by appropriately choosing the objects size, sensor element geometry, and the amplitude of the perturbation signal. A character recognition machine that is insensitive to translation and, to a lesser degree, dilations and angular orientation of the input samples is described. The system consists of three stages: (1) a receptor to make certain measurements on the input patterns to be classified; (2) a preprocessor to subdivide the pattern set into sixteen subsets; and (3) a categorizer to separate the members of the individual subsets. Author (TAB)

N69-29649*# Aztec School of Languages, Maynard, Mass. Research Translation Div.

ON THE ANALYSIS OF VISUAL PERCEPTIONS [ZUR PSYCHOPHYSIK DES SEHRAUMS. (THEORETISCHE BEDEUTUNG DES ZWEI KOMPLEMENTENSATZES)]

E. R. Jaensch Washington NASA Jun. 1969 30 p refs Transl. into ENGLISH from Z. Psychol. (Leipzig), Supple. v. 4, pt. 1, 1909 p 321-352

(Contract NASw-1692)

(NASA-TT-F-12101) Avail: CFSTI CSCL 06E

A theoretical dissertation on the nature of vision in light of recently established philosophical-methodological tenets is presented. The goal is to question findings (as well as methods and assumptions thereby employed) of neuroanatomical research on stimulation received by the retina, and the translations of it by the brain into impulses leading to behavior. Author

N69-29720# Naval Research Lab., Washington, D.C.
EXPERIMENTS IN DISCRIMINATION AND CLASSIFICATION

J. J. Freeman Dec. 1968 17 p refs
 (AD-684069; NRL-6742) Avail: CFSTI CSCL 5/10

In discrimination problems, one usually must consider many variates simultaneously. A nonparametric discrimination method, based on estimating the probability densities of two populations is now available and appears generally applicable to discrimination problems, based on the results of extensive experiments. The nonparametric method may also be combined with Gambas learning without teacher or classification procedure to obtain a new classification technique which considers all variates simultaneously.

Author (TAB)

N69-29721# Naval Medical Research Inst., Bethesda, Md.
SENSORY DEPRIVATION (SLEEP SATURATION) AND PERFORMANCE Interim Report

Thomas I. Myers Oct. 1968 21 p refs
 (AD-684074; MF12-524-003-1006-2; Rept-2) Avail: CFSTI CSCL 6/19

Experiments on the effects of sensory deprivation upon performance are summarized, and data and speculation presented to the effect that long term sensory deprivation may induce a state of sleep saturation entailing both a slowing of cortical activity and a resistance to drowsiness normally evident, for example on a vigilance task.

Author (TAB)

N69-29723*# National Aeronautics and Space. Ames Research Center, Moffett Field, Calif.
TOXICITY PROBLEMS IN PLASTIC HARDWARE DESIGNED FOR BIOLOGICAL SPACE-FLIGHT EXPERIMENTS

Richard Willoughby Washington Jun. 1969 7 p refs
 (NASA-TM-X-1818) Avail: CFSTI CSCL 06C

In the development of hardware for biological space flight, various plastic materials were found to be toxic to sea urchin sperm and unfertilized eggs. Glass control chambers were not. Acrylic and polycarbonate plastics were tested as material for the hardware body, while fluorocarbon elastomer rubber, nitrile, three silicone rubbers, butyl rubber, and ethylene propylene were tested as O ring materials. Fertilized frog eggs were found to be compatible with ethylene propylene and acrylic plastic after careful treatment, principally outgassing by vacuum exposure, but no treatment was discovered which would sufficiently detoxify plastic hardware so that it would maintain sea urchin sperm and unfertilized eggs.

Author

N69-29732# Naval Research Lab., Washington, D.C.
FUNGUS-INHIBITIVE COATINGS IN A JUNGLE ENVIRONMENT Final Report

F. T. Brannan, J. D. Bultman, and J. M. Leonard Feb. 1969 16 p refs
 (AD-684764; NRL-6849) Avail: CFSTI CSCL 6/6

The ability of ten candidate fungicides, singly and in combination, to suppress fungal growth on a variety of organic coatings under natural, tropical conditions was investigated. After 1 year of exposure, substantial protection for the susceptible coatings was afforded by copper-8-quinolinate and binary mixtures of p-toluenesulfonamide with copper-8-quinolinate and phenylmercuric phthlate in fairly low concentration. At a higher concentration,

p-toluenesulfonamide provided good protection for the susceptible coatings, while its n-ethyl derivative was less effective and its n-cyclohexyl derivative was almost inert. At an intermediate concentration, 2,3-dichloro-1,4-naphthoquinone and p-chlorophenoxyacetic acid provided effective protection for the susceptible coatings. None of the eight binary mixtures tested showed any evidence of synergism. The results confirm those obtained from earlier exposure programs; which showed that p-toluenesulfonamide is effective at higher concentrations in providing protection against fungal infestations. It was observed, however, that at very low levels this material may act as a growth promoter. Author (TAB)

N69-29740# Ohio State Univ. Research Foundation, Columbus.
ANALYSIS OF VISUAL AND PUPILLARY FUNCTIONING Final Comprehensive Report, 1 Jul. 1967-31 Dec. 1968

Torrence A. Makley, Jr. and William R. Biersdorf Jan. 1969 15 p
 (Contract DADA-17-67-C-7155)
 (AD-684362; Rept-3) Avail: CFSTI CSCL 6/16

To determine the site (or sites) of adaptation in the human eye, the components of the human electroretinogram were separately analysed by the incremental threshold technique at various levels of light adaptation and in dark adaptation. The human a-wave was found to adapt over at least three log units and was still not saturated at the highest adaptation tested. To develop an inexpensive method of recording human pupillary dilation and constriction, the c-wave of the electroretinogram was investigated. An inexpensive infrared electronic pupillograph was developed for the measurement of pupillary responses.

Author (TAB)

N69-29747# Joint Publications Research Service, Washington, D.C.

TRANSLATIONS ON EASTERN EUROPE SCIENTIFIC AFFAIRS, NO. 55. ON THE BIOMECHANISM OF INFORMATION PROCESSING

Pal Greguss 9 Jun. 1969 48 p refs Transl. into ENGLISH from Magy. Fiz. Folyoirat (Budapest), no. 6, Apr. 1968 p 526-538
 (JPRS-48186) Avail: CFSTI

The mechanism of biological information processing is interpreted on the basis of the hologram principle. Statements are substantiated partly by evaluating experimental data derived from echo location of bats, and partly on the basis of model experiments. It is proposed that the biological hologram principle may be generalized and with it higher order brain processes might be interpreted. Apparatus, experimental procedure, and computations are detailed, and future lines of investigation suggested. K. R.G.

N69-29751*# Martin Marietta Corp., Denver, Colo.
A PARAMETRIC STUDY TO DETERMINE TIME-TEMPERATURE-VACUUM RELATIONSHIPS FOR STERILIZATION OF TERRESTRIAL SPORES, PHASE 2 Summary Report

James A. Brierley Jun. 1969 37 p
 (Contract NAS9-9261)
 (NASA-CR-101701; MCR-69-269) Avail: CFSTI CSCL 06C

The results of a parametric study to determine time-temperature-vacuum relationships for sterilization of terrestrial bacterial spores are presented. Spores of *Bacillus* sp. G2, *Bacillus subtilis* var *niger*, and *Clostridium sporogenes* were exposed to temperatures of 100°, 105°, 110°, 115°, and 120°C at vacuum

(10^{-6} torr) and atmospheric pressure for periods of 1, 4, 8, and 16 hours. The data were used to determine the D-values for the test spores at the test and control conditions. The vacuum increased the rate of spore death for *Bacillus* sp. G2 and *B. subtilis* spores at all test temperatures. The spores of *Cl. sporogenes* were more resistant to heat within the vacuum at 100°, 105°, and 110°C, but they showed no detectable heat resistance within the vacuum at 115° and 120°C. The data indicated that temperatures above 110°C, even in the vacuum environment, need to be used for sterilization. Author

N69-29789# Joint Publications Research Service, Washington, D.C.

CHEMISM AND PHYSICO-CHEMICAL PROPERTIES OF PROCESSES OF MICROBIOLOGICAL OXIDATION OF PETROLEUM HYDROCARBONS

V. I. Karban et al 3 Jun. 1969 44 p refs Transl. into ENGLISH from USP. Khim. (Moscow), v. 38, no. 3 1969 p 539-559 (JPRS-48150) Avail: CFSTI

The article presents a survey of literature on the microbiological synthesis of protein substances from petroleum hydrocarbons. A general description is given of the process and the conditions of its occurrence, as well as the chemical mechanism of the microbiological oxidation of aliphatic, aromatic, and heterocyclic hydrocarbons. Particular attention is given to physicochemical and topochemical peculiarities of the process. It is shown that from the physicochemical viewpoint the process under consideration resembles emulsion oxidation of hydrocarbons. Author

N69-29796# Grumman Aircraft Engineering Corp., Bethpage, N.Y. Research Dept.

AIR POLLUTION CONTROL: A CRITICAL OVERVIEW

A. Hershaft Jun. 1969 33 p refs (RM-446) Avail: Issuing Activity

A concise critical introduction is presented on the general status and most pressing technical problem areas of air pollution control. Following a discussion of the nature, effects, and measurement of air pollutants, discharge and control problems are examined within the context of each of the three major sources of air pollution. Subsequent portions deal with control legislation and programs, and the concluding section outlines the most pressing technical problems in each of the areas mentioned. Author

N69-29841# Army Biological Labs., Fort Detrick, Md.
THE SECOND ALL-UNION CONFERENCE ON THE APPLICATION OF RADIOELECTRONICS IN BIOLOGY AND MEDICINE

Yu. B. Mandelstsvai Jul. 1968 4 p Transl. into ENGLISH from Med. Radiol. (Moscow), v. 7, no. 8, 1962 p 100-101 (AD-685373; Trans-916) Avail: CFSTI

At 11 sectional meetings, more than 100 reports were made. One of the sections was devoted to electronic equipment in physiological research using isotopes. Author (TAB)

N69-29847# Federal Aviation Administration, Oklahoma City, Okla. Office of Aviation Medicine.

ASSESSMENT OF THE BROCA-SULZER PHENOMENON VIA INTER- AND INTRA-MODALITY MATCHING PROCEDURES: STUDIES OF SIGNAL-LIGHT BRIGHTNESS

Mark F. Lewis and Henry W. Mertens Oct. 1968 10 p refs (FAA-AM-68-27) Avail: CFSTI

This study was concerned with the effect of method of measuring brightness and with the effect of adaptive state of the eye on the Broca-Sulzer phenomenon. Subjects adjusted the luminance of test flashes 1 to 1000 msec. in duration to match either the loudness of a 500 msec. comparison tone (1000 Hz) or the brightness of a 500 msec. comparison flash. Comparison tone loudness were 75, 86, and 97 dB. Comparison flash luminances were 10, 100, and 1000 mL. In the light-adapted condition, a 1.5 sec. adapting flash was presented 2.5 sec. before the comparison flash. No adapting flash was presented in the dark-adapted condition. The Broca-Sulzer effect appeared only with the highest comparison stimulus intensities in both crossmodality matching and brightness matching conditions. An interaction found between method of measuring brightness and adaptive state was also discussed. Author

N69-29872# Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.

STEREOSCOPIC AND RESOLUTION ACUITY WITH VARYING FIELD VIEW

Saul M. Luria 6 Dec. 1968 11 p refs (AD-685229; SMRL-557) Avail: CFSTI CSCL 6/16

Resolution and stereoscopic acuity were measured while the field of view was varied in size--without, however, obstructing the targets for either eye. Resolution acuity showed no marked or regular changes, but stereoacuity was progressively reduced as the field of view was constricted. This supports the hypothesis that the sharp decline in stereoacuity is due to loss of peripheral visual stimuli and suggests that the introduction of such cues underwater should improve stereoacuity. Several possible explanations of the phenomenon are discussed. Author (TAB)

N69-29896# Centre d'Etudes de Physiologie Nerveuse et d'Electrophysiologie, Paris (France).

NERVOUS PROCESSES UNDERLYING BEHAVIOUR AND LEARNING Final Scientific Report, 1 May 1967-30 Apr. 1968

A. F. Fessard (Coll. de France) Apr. 1968 11 p (Grant AF-FOAR-67-40) (AD-684734; AFOSR-69-0580TR) CSCL 6/3

The aim of the research has been to evaluate the involvement of different cortico-subcortical structures in certain aspects of sleep, pain, and learning. Author (TAB)

N69-29901# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

BIOLOGICAL ACTION OF HIGH-ENERGY PROTONS, VOLUME 1

Yu. G. Grigoreva Oct. 1968 338 p refs Transl. into ENGLISH of the book "K Otsenke Radiatsionnoy Opasnosti Kosmicheskikh Poletov" Moskva, Atomizdat, 1967 508 p (AD-685622; FTD-MT-24-150-68-Vol-1) Avail: CFSTI CSCL 6/18

This monograph deals with radiobiological problems which must be solved before man can master outer space. It deals in

particular with the immediate and remote effects of ionizing radiation on man. It consists of seven chapters, some of which contain several separate articles. These are by various authors who cite the results of their own experiments and also refer very extensively to other investigations, both Soviet and foreign. These articles are consolidated under the following main headings: Physical aspects of radiation safety of space flight; Biological foundations for radiation safety of space flights; Model radiobiological investigations of the action of high-energy protons; Biological action of protons on mammals and birds; Radiobiological effects of the action of protons on plants; Clinico-physiological observations of persons working on accelerators; Prophylaxis and therapy of proton injuries; Radiobiological materials as the basis for the local protection of astronauts.

TAB

N69-29902# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

BIOLOGICAL ACTION OF HIGH-ENERGY PROTONS, VOLUME 2

Yu. G. Grigoreva Oct. 1968 320 p Transl. into ENGLISH of the book "K Otseken Radiatsionnoi Opasnosti Kosmicheskikh Poletov" Moskva, Atomizdat, 1967 508 p (AD-685486; FTD-MT-24-101-68-Vol-2) Avail: CFSTI CSDL 6/18

For abstract, see N69-29901.

N69-29907# Federal Aviation Administration, Oklahoma City, Okla. Office of Aviation Medicine.

IMPACT INJURY TO THE PREGNANT FEMALE AND FETUS IN LAP BELT RESTRAINT

Richard G. Snyder, Clyde C. Snow, Warren M. Crosby, Peter Hanson, Jerry Fineg et al Dec. 1968 10 p refs (FAA-AM-68-24) Avail: CFSTI

It is established that the lap (seat) belt offers considerable protection against injury or death in crash environments; but there has been controversy over the injury potential to the pregnant female. This question is of importance in consideration of restraint and seat protective environments for both aircraft and automotive vehicles. This study is concerned with the clinical, experimental, and applied aspects of the problem. Tests utilizing pregnant baboons were run on the Daisy Decelerator, and clinical case histories were obtained in automotive accidents involving late-term pregnant women through cooperation of the California and Oklahoma Highway Patrol and individual obstetricians. Medical evidence for concern is outlined, and the experimental findings to date are noted. Author

N69-29943*# General Technical Services, Inc., Upper Darby, Pa. **DEVELOPMENT OF A SPECTRAL ANALYZER Progress Report, 8 Mar.-7 Jun. 1969**

A. S. Iberall 26 Jun. 1969 4 p (Contract NASw-1815)

(NASA-CR-101670; PR-3) Avail: CFSTI CSDL06C

Research continued on the glucose level in mammalian blood by analysis of 15 second samples obtained from 10 rats. The results were found to be in agreement with those of previous studies on guinea pigs, mice, and humans. Also of importance was a comparison analysis of two subjects, one with polycythemia. The

results, while inconclusive, did show very large oscillations in the polycythemic subject. Another area of experimentation involved a study of the effects of hyperoxia on the flow of red cells in capillaries in the panniculus muscle of the mouse. Two subjects were taken up to 4 atmospheres of pure oxygen in increments of 1 atmosphere for periods at one hour at each stage and one half hour at the highest pressure. Results indicated no serious changes in the microvasculature.

D.L.G.

N69-29954# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE APPLICATION OF AVIATION IN AGRICULTURE AND FORESTRY, PART 1

M. B. Azaryan et al 23 Aug. 1968 268 p refs Transl. into ENGLISH of the book "Primenenie Aviatsii v Selskom i Lesnom" Moscow, izd-vo Transport, 1966 p 1-381

(AD-685458; FTD-MT-24-101-68-Pt-1) Avail: CFSTI CSDL 2/1

The work gives an account of aerial agricultural operations in the USSR and the latest achievements of science and advanced experimentation in the field. It describes the agricultural apparatus of aircraft and helicopters; the chemicals used in aerial- and chemical operations and the methods of their application; the periods in which the aerial treatments are conducted in the various agricultural crops; the aerial-chemical methods of controlling weeds, pests and diseases of agricultural crops and forests and also infection carriers; and the organization of aerial-chemical operations in the application of aviation to agriculture and forestry.

Author (TAB)

N69-29955# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE APPLICATION OF AVIATION IN AGRICULTURE AND FORESTRY, PART 2

M. B. Azaryan et al 23 Aug. 1968 206 p refs Transl. into ENGLISH of the book "Primenenie Aviatsii v Selskom i Lesnom" Moscow, izd-vo Transport, 1966 p 1-381

(AD-685419; FTD-MT-24-101-68-Pt-2) Avail: CFSTI CSDL 2/1

The work gives an account of aerial agricultural operations in the USSR and the latest achievements of science and advanced experimentation in the field. It describes the agricultural apparatus of aircraft and helicopters; the chemicals used in aerial- and chemical operations and the methods of their application; the periods in which the aerial treatments are conducted in the various agricultural crops; the aerial-chemical methods of controlling weeds, pests and diseases of agricultural crops and forests and also infection carriers; and the organization of aerial-chemical operations in the application of aviation to agriculture and forestry.

Author (TAB)

N69-29984# Embry-Riddle Aeronautical Inst., Daytona Beach, Fla.

ANGLE OF ATTACK PRESENTATION IN PILOT TRAINING Final Report

Frank G. Forrest Mar. 1969 77 p refs (Contract FA-67-W-1811)

(FAA-DS-69-6) Avail: Issuing Activity

The possible value of angle of attack presentation in addition to other required instruments for flight training in general aviation aircraft was determined. Two groups of inexperienced flight students from the same population as measured by a mental aptitude test (CTMM) participated in identical flight training programs at the

private pilot level. However, the experimental group completed the course using an angle of attack indicator. Statistical comparison of performance measurement scores revealed no significant difference in ability between the two groups. It was concluded that the angle of attack indicator in addition to airspeed was unimportant during private pilot flight training. Author

N69-29986# Commissariat à l'Energie Atomique, Fontenay-aux-Roses (France). Centre d'Etudes Nucléaires.
EFFECT OF NON-LETHAL WHOLE-BODY GAMMA IRRADIATION ON THE SPONTANEOUS AND EVOKED ELECTROENCEPHALOGRAPHIC ACTIVITIES OF THE ADULT RABBIT [EFFETS D'UNE IRRADIATION GAMMA GLOBALE NON LETALE SUR LES ACTIVITES ELECTROENCEPHALOGRAPHIQUES SPONTANÉES ET EVOQUEES DU LAPIN ADULTE]
 Louis Court Feb. 1969 206 p refs In FRENCH; ENGLISH summary
 (CEA-R-3693) Avail: CFSTI

All the experimental methods described (animal preparation, precise physiological techniques, dosimetry, biological information processing) allowed one to follow the changes during 15 days in the spontaneous and evoked electroencephalographic activities of rabbits submitted to non-lethal 400 rads whole-body γ -irradiation. Behavioral troubles, changes in the arousal state and in the spontaneous electrical activity of the neo-cortex and hippocampus were noted continuously together with enhanced cortical excitability, and the appearance of elements of the paroxystic series sometimes contrasting with a general decrease in amplitude. After a visual stimulus the general morphology of evoked activities at the level of the primary visual areas and hippocampus was unchanged, but enhanced latencies and delays and less systematic modifications in amplitudes seemed to show a direct effect of radiation on the nervous system and sensorial activities; these troubles seemed to arise independently from the basic electrical activity. The changes observed were usually transitory and varied with each individual. A hypothesis is presented to explain the arousal troubles and the general evolution of spontaneous electrical activity in the brain.

Author (ESRO)

N69-30085*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A MATHEMATICAL MODEL OF THE EFFECT OF A PREDATOR ON SPECIES DIVERSITY
 J. N. Yang and C. R. Weston 15 Jun. 1969 24 p refs
 (Contract NAS7-100)
 (NASA-CR-101669; JPL-TR-32-1359) Avail: CFSTI CSCL 06C

The presence of two species in the same environment with a common limiting resource is paradoxical if competition for the limiting resource is the only consideration: one or the other of the species must be eliminated. This analysis shows that a normally unsuccessful competitor for the limiting resource may persist when there is a predator on the otherwise successful species. The modified assumption and different parametric values which are considered do not alter this generalization. The working model is of bacteria growing in a chemostat; however, there is no reason to assume the resultant conclusions are restricted to a bacterial system, an experimental situation, or terrestrial organisms. Author

N69-30091# Commissariat à l'Energie Atomique, Fontenay-aux-Roses (France). Centre d'Etudes Nucléaires.
EFFECTS OF DIETHYLENE TRIAMINE PENTA-ACETIC ACID AEROSOL ON LUNG CONTAMINATION BY LANTHANUM [INFLUENCE DU DTPA EN AEROSOL SUR LES CONTAMINATIONS PULMONAIRES AU LANTHANE]

Christian Pasquier, Dominique Voisin, Pierre Thieblemont, Gérard Perrault, and Jean-Pierre Bayard Apr. 1969 21 p refs In FRENCH; ENGLISH summary
 (CEA-R-3735) Avail: CFSTI

Applying DTPA aerosol for the treatment of lung contamination by lanthanum gave data on its effectiveness as a function of time. Provided it was administered early during the two hours after exposure, over 50 per cent could be removed using lower therapeutic doses than those prescribed for other routes of administration. Its association with various enzymes did not enhance the chelator therapeutic effect. The constant of passage of lanthanum through the alveolar wall was calculated to be 0.016 mn⁻¹. A large part cannot be mobilized by DTPA and the physicochemical mechanisms involved in this protection are now being investigated.

Author (ESRO)

N69-30114*# Chicago Univ., Ill. Dept. of Biophysics.
INTEGRATED RESEARCH AND TRAINING PROGRAM IN MOLECULAR BIOLOGY: ULTRASTRUCTURE AND ELECTRON MICROSCOPY Annual Progress Report
 Humberto Fernandez-Moran [1968] 69 p refs
 (Grant NsG-441-63; Contract AT(30-1)-2278; Grants NIH B-2460; NIH NB-04267)
 (NASA-CR-101583) Avail: CFSTI CSCL 06C

A progress summary is presented on an integrated research and training program in molecular biology. The major effort during the past year was devoted to the organization and initial operation of the special electron microscope laboratories for the proposed program. Specific research was carried out in the following areas: continuation of correlated electron microscope and biochemical studies of mitochondrial membranes which resulted in the detection and isolation of a fundamental unit of energy transduction and studies of pyruvate dehydrogenase complex of *Escherichia coli*; electron microscope and electron diffraction studies of DNA macromolecules in solution; collateral development work on improvement of preparation techniques and instrumentation for high resolution electron microscopy; correlated electron microscope and electron diffraction studies of Orgueil carbonaceous chondrite and pre-Cambrian organized systems; and development of techniques for electron optical examination of extraterrestrial matter. B.P.

N69-30166# Federal Aviation Administration, Washington, D.C. Dept. of Transportation.
MEDICAL FACTORS IN U.S. GENERAL AVIATION ACCIDENTS

P. V. Siegel and S. R. Mohler Jan. 1969 8 p refs
 (AM-69-2) Avail: Issuing Activity

About 90 percent of fatal U. S. general aviation accidents involve factors other than the aircraft or outside circumstances. This necessarily brings the flight surgeon into the mainstream of aviation safety activities. This paper describes some relatively recent accidents which illustrate the roles played by medical factors. Preventive programs are discussed which have a direct focus on the medical factors which will potentially contribute to future accidents.

Author

N69-30168*# Harvard Univ., Boston, Mass. School of Public Health.
PREDICTING HUMAN PERFORMANCE IN SPACE ENVIRONMENTS
 Warren H. Teichner and Diane Olson Washington NASA Jun. 1969 186 p refs

(Grant NGR-22-007-070)

(NASA-CR-1370) Avail: CFSTI CSCL 06L

An attempt is made to provide a systematic framework which can be used for predicting the effects of the physical environment on human performance. The nature of the approach was: (1) to develop a general classification scheme for the description of tasks; (2) to develop postulates from the basic literature of psychology so as to formulate a quantitative model of wide scope representing fundamental behavioral processes assumed to underlie performance at the tasks; (3) to develop relationships between environmental conditions and major physiological effects known or thought to result from them; (4) to postulate relationships between selected ones of the underlying behavioral processes and the physiological effects, and then to use these relationships along with the performance model to predict the effects of the environment on performance, and (5) to develop a general criterion for determining the environmental conditions which should be considered limiting

Author

N69-30210# Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div

SOME PROBLEMS IN PREVENTING MOTION INTERFERENCES DURING PROLONGED EKG INVESTIGATIONS

E. D. Dubrovin Jul. 1968 15 p refs Transl into ENGLISH from the book "Radioelektronnye Priory Dlya Biologicheskikh i Meditsinskikh Issledovaniy" Moscow, Izd-Vo Nauka, 1968 p 18-29 (AD-685144; FTD-HT-23-336-68) Avail: CFSTI CSCL 6/5

Experiments were performed to investigate the possibilities of using the synchronous cumulation method for isolating EKG recordings from interferences caused by movements of the subject. A specialized medical data-processing computer, the ATAS-401 (Nihon Konden Kogyo Co., Ltd., Tokyo, Japan) which accomplishes synchronous cumulation was used in the experiments. A schematic diagram showing the connection of the devices used is shown. Use of the synchronous cumulation method greatly improved the structure of EKG curves recorded during various movements of the subject. Results of three cumulated EKG recordings indicated that interferences produced by movements are rarely characterized as a stationary random process. In a majority of cases, the character depends on the time factor. Selection of the number of cumulation cycles is discussed. Successful use of the synchronous cumulation method depends on the periodicity of the cumulated signal. Problems in recording signal changes and a method of automatic regulation are discussed. The synchronous cumulation method with automatic regulation of cumulation time depending on the interference level is now being clinically tested in a new variant of the device for recording oxygen starvation of the human cardiac muscle.

Author (TAB)

N69-30217# Iowa Univ., Iowa City. Dept. of Mathematics.
MEMORY REQUIREMENTS OF TWO-WAY VERSUS ONE-WAY AUTOMATA

Bruce H. Barnes Feb. 1969 8 p refs

(Contract N00014-68-A-0500)

(AD-684841; THEMIS-UI-TR-5) Avail: CFSTI CSCL 6/4

The article presents an example of a two-way automaton which has significantly fewer states than any one-way automaton accepting the same set of tapes. Thus, memory space can be saved by using a two-way automaton. This savings in space, however, is accompanied by an increase in recognition time.

Author (TAB)

N69-30226# Pittsburgh Univ., Pa. Dept. of Pharmacology.

DESIGN AND EVALUATION OF EXPERIMENTS WITH LABYRINTHINE STATORECEPTORS

Gerhard Wernek, Hershel Sacks, and James Fierst Mar. 1969 18 p refs

(Grant AFOSR-1005-66)

(AD-685171; TR-2; AF-AFOSR-69-0852TR) Avail: CFSTI CSCL 6/12

The report establishes a theoretical framework and computational procedures which lead to an experimental strategy for distinguishing between two alternative modes of operation of the vestibular statoreceptors: the question is whether individual kinocilia in the maculae sacculi and utricle are innervated by single vestibular afferent fibers; or else, whether convergence of neural discharges originating from several kinocilia with different orientation of functional polarization occurs in vestibular afferent fibers. If the former condition prevails, it is possible to calculate the vector of maximal sensitivity of each kinocilium from the polar plot of nerve discharge rates, obtained at suitable head positions in the gravity field. The principle of the procedure consists in the matching of experimental data with a computer simulated model of sacculus and utricle.

Author (TAB)

N69-30255# Tulane Univ., New Orleans, La. La Delta Regional Primate Research Center.

A STUDY OF THE FEASIBILITY OF STIMULATING NEURONS BY ELECTROMAGNETIC WAVES

Ernest E. Erickson (La. State Univ.) and Ralph A. Kinney (La. State Univ.) Mar. 1969 35 p refs Final Rept. made at Stanford Res. Inst.

(Contracts Nonr-475(11); N00014-68-C-0184)

(AD-685644; TR-2) Avail: CFSTI CSCL 6/16

This study was to determine the feasibility of using externally applied electromagnetic fields to selectively stimulate electrically any desired point deep in the brain of primates using external electrodes. The squirrel monkey was chosen as the animal specimen for all calculations. Values of the dielectric constants and conductivity of biological tissue and the consequent electromagnetic properties were applied to three potential methods described in detail, including a pulsing technique, a focusing lens system, and a method of creating standing waves in the brain. For all three methods, it was found to be impossible to electrically stimulate neurons within the brain using microwave frequencies. This is because relatively high frequencies are necessary to obtain accuracy, but attenuation of the electrical field increases exponentially with frequency, thereby limiting depth of penetration. One possible solution is to search for an attenuation window in brain substance, much as exists for sea water at visible light frequencies.

Author (TAB)

N69-30274*# Aztec School of Languages, Inc., Maynard, Mass.

SWEAT LOSS AND BEVERAGE INTAKE OF MINERS AND LABORERS EMPLOYED IN A HIGH TEMPERATURE ENVIRONMENT [SCHWEISSVERLUST UND GETRAENKEAUFNAHME BEI BERGLEUTEN UND HITZEARBEITERN]

Gunther Lehmann et al Washington NASA Jun. 1969 25 p refs Transl. into ENGLISH from Arbeitsphysiol. (West Ger.), v. 11, 1941 p 73-100

(Contract NASw-1692)

(NASA-TT-F-12313) Avail: CFSTI CSCL 06P

Studies were carried out on 21 miners and 16 laborers of various plants to obtain high temperature environment data on the magnitude of sweat loss during the working shift, on chlorine loss, on water intake and chlorine supply. Beside an absolute water

N69-30350

and chlorine balance, an osmotic balance was calculated from the results, which indicates to what extent the subjects have drunk too much or too little for the maintenance of the osmotic pressure of their tissue fluid. It was determined that the miners drink, for the most part, too little and leave their place of employment with a safety fluid deficit. Author

N69-30350# Board of Trade, London (England).
**THE SAFETY PERFORMANCE OF UNITED KINGDOM
AIRLINE OPERATORS: SPECIAL REVIEW**
1968 113 p
Avail: HMSO 8s 6d

The results of an aircraft accident investigation are presented. The responsibilities of the Aviation Safety Division and the Air Registration Board are outlined, and the history and procedures of the air operator's certificate are reviewed. An analysis of accidents from 1955 to 1967 shows that pilot's incompetence and poor judgment, and aircraft airworthiness deficiencies were the factors contributing most to the accidents. A statistical study indicates that the safety levels of public transport operators have improved, the safety levels of independent operators were significantly lower than that of corporations, and the safety levels of the United Kingdom airlines are equal to those achieved by French and ICAO airlines but are probably lower than those of United States and Australian airlines. The effects of aircraft age on safety were also examined, and it is felt that age is a minor influence, however, newer craft are designed to a higher standard. Recommendations are made for improving the training, testing, and licensing of air and ground crews and maintaining and checking the aircraft. N.E.N.

N69-30354# Gesellschaft fuer Strahlenforschung m.b.H., Munich (West Germany). Institut fuer Biologie.
**PATHOGENESIS OF GENETIC AND SOMATIC RADIATION
DAMAGE [PATHOGENESE GENETISCHER UND
SOMATISCHER STRAHLENSCHAEDEN] Annual Report, 1966**
May 1969 23 p refs In GERMAN; ENGLISH summary
(Contract EURATOM-045-65-1-BIAD)
(EUR-4097.d) Avail: CFSTI

The frequency and mode of origin of genetic damage and delayed somatic damage induced in animals by ionizing radiation are discussed. In research on mammals (mice) and fish, mutations at specific loci and lethal mutations were studied, likewise the effects of radiation on polygenic factors and the extent to which these are dependent on dose and dose-rate. In the course of electrophysiological research on the central nervous system in normal and irradiated cats, the reaction potentials of various cortical regions were analyzed and measurements concerning the electrical excitability of the neocortex were effected. The work is centered on investigations of radium-224 (thorium X) and comparison with the longlived radium-226, with particular reference to the formation of bone tumors. A study was begun on delayed damage after the incorporation of radium-224 in mice. Histopathological and histochemical studies were conducted on bones following internal and external irradiation, together with studies on the behavior of the alkaline phosphatase in the mucous membrane of the small intestine in mice after X-irradiation, and on the influence of a whole-body irradiation on the spleen enzyme pattern in various species of animals. Author

IAA ENTRIES

A69-30036 *

CONTROL OF ATP-DEPENDENT CO₂ FIXATION IN EXTRACTS OF HYDROGENOMONAS FACILIS - NADH REGULATION OF PHOSPHORIBULOKINASE.

R. D. MacElroy (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.), E. J. Johnson, and M. K. Johnson (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.; Tulane University, Medical School, Dept. of Microbiology, New Orleans, La.).

Archives of Biochemistry and Biophysics, vol. 131, Apr. 1969, p. 272-275. 8 refs.

NSF Grant No. GB-7492.

The role of NADH in stimulating ATP-dependent CO₂ fixation has been examined in crude extracts of *Hydrogenomonas facilis*. It has been found that the stimulation cannot be attributed to reduction of the product, 3-phosphoglyceric acid, and consequent regeneration of substrate. Rather, NADH appears to specifically affect phosphoribulokinase, probably by causing an allosteric transition of this regulatory enzyme. The kinetics of the NADH effect on CO₂ fixation suggest cooperative binding of the effector. A similar cooperative response of the enzyme to ATP has been noted. It is suggested that the control of CO₂ fixation is mediated by allosteric regulation of phosphoribulokinase activity. (Author)

A69-30055 #

ROLE OF THE CENTRAL ADRENERGIC MECHANISMS IN CHANGES IN THE NEUROSECRETORY FUNCTION OF THE HYPOTHALAMO-HYPOPHYSIAL SYSTEM UNDER THE ACTION OF ACCELERATIONS [O ROLI TSENTRAL'NYKH ADRENERGICHESKIKH MEKHAANIZMOV V IZMENENII NEUROSEKRETORNOI FUNKTSII GIPOTALAMO-GIPOFIZARNOI SISTEMY PRI VOZDEISTVII USKORENII].

L. A. Andrianova (Institut Mediko-Biologicheskikh Problem, Moscow, USSR).

Akademiia Nauk SSSR, Doklady, vol. 185, Mar. 21, 1969, p. 717-719. 11 refs. In Russian.

Study of the possible role of the central adrenergic mechanisms in the neurosecretory function of the hypothalamo-hypophyseal system of a group of 38 male rabbits subjected to transverse accelerations of 10 g for 4 min in a centrifuge. Aminazine was administered intravenously to the rabbits 15 min before experiments in order to block the activity of the adrenergic system. The effect of aminazine injections on the composition and morphology of neurons in the supraoptical nucleus of the hypothalamus of the rabbits is investigated. It is concluded that the adrenergic system stimulates the neurosecretory activity of the hypothalamo-hypophyseal system after accelerations.

V. Z.

A69-30187 #

REMOTE MANIPULATORS IN SPACE.

Alfred Interian (General Electric Co., New York, N.Y.) and Donald Kugath (General Electric Co., Schenectady, N.Y.).

Astronautics and Aeronautics, vol. 7, May 1969, p. 40-51. 8 refs.

Discussion of deep-submergence vehicles, prosthetics, robot-like manipulators and other nuclear hot-lab manipulator systems as potential performers in space missions. Three simplified manipulator-joint designs are illustrated, and a block diagram of a master-slave remote manipulator is shown. A block diagram of an entire remote-manipulator space system is given, and some manipulator studies are tabulated. It is shown that laboratory time studies have already demonstrated that a manipulator system rivals a space-suited astronaut in executing typical space-maintenance tasks. Some possible missions envisioned for remote manipulators include a thorough survey of the regional resources of the moon and planets, the exploration of asteroids, high-radiation-environment operations, and exercises of marginal technology. B.H.

A69-30394 *

MANNED TEST OPERATIONS RELATED TO THE APOLLO LUNAR MODULE IN THE SIMULATED SPACE ENVIRONMENT.

O. L. Pearson (NASA, Manned Spacecraft Center, Houston, Tex.) and P. R. Gauthier (Boeing Co., Seattle, Wash.). IN: MAN IN HIS ENVIRONMENT; INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING AND EQUIPMENT EXPOSITION, 15TH, ANAHEIM, CALIF., APRIL 20-24, 1969, PROCEEDINGS. [A69-30356 15-11] Mt. Prospect, Ill., Institute of Environmental Sciences, 1969, p. 459-474.

Description of a series of tests conducted to confirm spacecraft performance in the thermal vacuum (TV) environment and to verify flight operating procedures related to the Apollo lunar module. Tests were conducted of a representative spacecraft, manufactured and checked out in the same manner as the flight spacecraft. To simulate the mission time lines, it was necessary to seek a thermal similarity and introduce the two crewmen at that point. The test crewmen entered the spacecraft cabin under TV conditions and energized the vehicle systems in much the same manner as is planned in flight.

G. R.

A69-30406 *

HISTOLOGICAL AND HISTOCHEMICAL OBSERVATIONS ON THE CAPSULE OF THE MUSCLE SPINDLE IN NORMAL AND DENERVATED MUSCLE.

T. R. Shantha, M. N. Golarz, and G. H. Bourne (Emory University, Yerkes Regional Primate Research Center, Atlanta, Ga.). Acta Anatomica, vol. 69, 1968, p. 632-646. 33 refs.

NIH Grants No. FR-00165; No. NB-02038; Grant No. NGR-11-001-016.

Study of the distribution of various groups of dephosphorylating enzymes on the normal muscle spindle of the guinea-pig thigh muscle with its nerve supply intact, and on the muscle spindles of normal and denervated calf muscles of the cat. The localization of a number of dephosphorylating enzymes in the capsule of the muscle spindle is described. The identical nature of the capsule of the muscle spindle and the perineural epithelium of peripheral nerves is confirmed by histochemical means.

G. R.

A69-30412 *

THE NATURE AND SIGNIFICANCE OF INVERTEBRATE CARTILAGES.

Philip Person (U.S. Veterans Administration, Hospital, Brooklyn, N.Y.; NASA, Ames Research Center, Moffett Field, Calif.) and Delbert E. Philpott (Marine Biological Laboratory, Woods Hole, Mass.).

Biological Reviews, vol. 44, 1969, p. 1-16. 97 refs.

Discussion of the occurrence and nature of invertebrate endoskeletal cartilage and cartilage-like tissues. The cellular endoskeletal tissues of coelenterates, molluscs, arthropods, and annelids that are considered to be cartilage or appear to be closely related to it, are discussed. Some explanations of the possible origin of cartilage in the invertebrates are given.

M. G.

A69-30413 *

STUDIES ON THE ENERGY METABOLISM OF HUMAN LEUKOCYTES. II.

Jean L. Baierlein (Wesleyan University, Dept. of Biology, Middletown, Conn.) and John M. Foster (National Science Foundation, Div. of Undergraduate Education in Science, Washington, D.C.). Blood, vol. 32, Sept. 1968, p. 412-422. 25 refs.

PHS Grant No. CA-050-98; AEC Contract No. AT (30-1)-1845; Grant No. NGT-22-004-003.

Study of the control of glycolysis by respiration in normal human leukocytes under conditions in which a Pasteur effect was present, and under conditions in which this effect was lost. It is shown that there is a 20 to 50% Pasteur effect in leukocytes isolated by dextran sedimentation of heparinized blood and suspended in isologous serum. Crossover-point analysis of glycolytic intermediates indicates that phosphofructokinase (PFK) becomes rate-limiting for aerobic glycolysis and that this enzyme is primarily responsible for the

A69-30444

Pasteur effect. Studies on the activity of PFK in leukocyte homogenates showed that this enzyme is competitively inhibited by ATP and reactivated by ADP and Pi. The concentrations of these compounds which significantly effect PFK activity in homogenates fall within the range found in intact cells. The differences in PFK activity in intact cells under anaerobic and aerobic conditions can therefore be attributed to allosteric effects caused by an increase in the concentrations of ATP on transition to aerobic conditions, with concomitant decreases in the levels of ADP and Pi. M.G.

A69-30444 *

DIFFERENCES BETWEEN RADIATION-INDUCED LIFE SHORTENING AND NATURAL AGING IN DROSOPHILA MELANOGASTER. Henri Atlan (NASA, Ames Research Center, Moffett Field, Calif.), Jaime Miquel, and Rosemarie Binnard.

Journal of Gerontology, vol. 24, Jan. 1969, p. 1-4. 7 refs.

Study of the mortality kinetics of *Drosophila melanogaster* showing essential differences between gamma radiation-induced life shortening and normal aging. Gamma irradiation of *Drosophila melanogaster* imagoes 1 to 20 days of age resulted in death at a constant time after exposure. Age at irradiation influenced survival time only when the flies were irradiated 30 to 90 days after eclosion. These results suggest that the life-shortening effects of gamma radiation on *Drosophila* are the result of a radiation syndrome which, at least for 1 to 20 day old flies, is unrelated to aging. P.v.T.

A69-30445 *

A CONTINUOUS CULTURE DEVICE FOR PROTOZOAN CELLS.

J. R. Cook (Maine, University, Dept. of Zoology, Orono, Me.). *Journal of Protozoology*, vol. 15, no. 3, 1968, p. 452-455. 7 refs. PHS Grant No. GM-12179; Grants No. NSG-338; No. NGL-20-006-001.

Description of a continuous culture device suitable for controlled growth of *Euglena gracilis*. It could probably be adapted to other similar cell types with generation times no greater than 150-200 hr (Author)

A69-30446 *

DEFECTIVE BACTERIOPHAGE PBSH IN BACILLUS SUBTILIS. II. Martin Haas and Hiroshi Yoshikawa (California, University, Space Sciences Laboratory, Berkeley, Calif.). *Journal of Virology*, vol. 3, Feb. 1969, p. 248-260. 27 refs. Research supported by the American Cancer Society; Grant No. NGR-05-003-020.

Description of a new type of defective bacteriophage, PBSH, which produced large numbers of phage particles after induction, without detectable replication of phage deoxyribonucleic acid. Treatment of *Bacillus subtilis* strain 168 with mitomycin C caused induction of a defective prophage, PBSH. During induction, extensive deoxyribonucleic acid synthesis took place. Concurrently, a change in marker frequency of the bacterial DNA was noticed. G.R.

A69-30453

TOTAL IN-FLIGHT SIMULATION - A MAJOR RESOURCE FOR AIR TRANSPORT SAFETY.

A. M. Johnston (Aero Spacelines, Inc.; Tex Johnston, Inc., Santa Barbara, Calif.).

Perspective, 1st Quarter, 1969, p. 3-9.

Discussion of the air transport industry's safety record since 1958. The data presented consist of information and statistics compiled by and for the air-transport industry by reliable fact-gathering agencies and organizations. Crashes and their causes are discussed. The use of variable-stability research planes to simulate the airborne behavior of aircraft under development and to demonstrate handling qualities characteristics to test pilots of the Navy, Air Force, and Federal Aviation Agency is cited. M.M.

A69-30456 *

REFLECTANCE OF COTTON LEAVES AND THEIR STRUCTURE.

H. W. Gausman, W. A. Allen, and R. Cardenas (U.S. Department of Agriculture, Agricultural Research Service, Soil and Water Conservation Research Div., Weslaco, Tex.).

Remote Sensing of Environment, vol. 1, Mar. 1969, p. 19-22. 35 refs. NASA-supported research.

Cotton plants were grown hydroponically with low-, medium-, and high-salinity substrate levels formulated with sodium chloride. Leaves were sampled from third and fourth nodes down from apexes of cotton plants, simulating what an overhead remote sensor would see. A spectrophotometer was used to measure reflectance and transmittance of light impinging on upper surfaces of individual leaves. Total reflectance of light in the 750- to 1300-mμ spectral range was greater from leaves of cotton plants grown in medium- and high-salinity substrates than from those grown in low-salinity substrates. This increase in reflectance and a lessening in absorbance were consistent with the observed thicker leaves of the saline substrate-grown plants which had larger palisade cells and loosely arranged spongy mesophyll. These structural changes resulted in more intercellular spaces, thus supporting the premise that internal scattering of light is increased by cell-wall/air-cavity interfaces. (Author)

A69-30462

PSYCHOPHYSIOLOGIC FACTORS IN USAF AIRCRAFT MISHAPS INVOLVING GROUND EGRESS.

Victor J. Ferrari, Jr. and Robert H. Shannon (USAF, Life Sciences Group, Norton AFB, Calif.).

(SURVIVAL AND FLIGHT EQUIPMENT ASSOCIATION, ANNUAL NATIONAL FLIGHT SAFETY, SURVIVAL AND PERSONAL EQUIPMENT SYMPOSIUM, 6TH, SAN DIEGO, CALIF., OCTOBER 1-3, 1968, PROCEEDINGS, p. B35-B48.)

Safe Engineering, vol. 3, Dec.-Jan. 1969, p. 12-15.

[For abstract see issue 06, page 878, Accession no. A69-16959]

A69-30470 *

GRAVITY AND THE UPRIGHT PLANT.

Charles J. Lyon (Dartmouth College, Hanover, N.H.).

Yale Scientific Magazine, vol. 43, Nov. 1968, p. 6-9, 24.

Grant No. NGR-30-001-001.

Investigation of the effect of the force of gravity on plant growth. Identical growth rates and patterns of leaves and roots in the Biosatellite 2 experiments and in the ground control experiments on horizontal clinostats have confirmed the reliability of the clinostat method for studies of geotropism and related phases of growth physiology. From research using this old device and modern methods for analysis of auxin transport in plant organs, it is possible to explain the paradoxical situation where plants grow upward and easily produce heavy leaves as lateral appendages in spite of the gravitational force that tends to topple such a structure. G.R.

A69-30587 *

ENERGY LEVELS OF HUMAN BODY SEGMENTS DURING LEVEL WALKING.

H. J. Ralston and L. Lukin (California, University, Medical Center, Biomechanics Laboratory, San Francisco, Calif.).

Ergonomics, vol. 12, no. 1, 1969, p. 39-46. 14 refs.

NIH-supported research; Grant No. NGR-05-025-001.

Description of a method for measuring the mechanical energy levels of the principal body segments during walking at moderate speeds on the treadmill. Together with metabolic measurements, the method provides a powerful means of analyzing human locomotion. It is shown that the energy level of the HAT (head+arms+trunk) tends to remain constant - except for a period during transition from stance to swing - and therefore acts as a semiconservative system. The main input of muscular work occurs during the period shortly preceding and following heel contact, agreeing with electromyographic studies of muscle activity during walking. The push-pull character of walking is evident from the mechanical energy curves. The metabolic and mechanical effects of load are described, particularly as related to gravitational and inertial effects. The gross efficiency of the external work performed during walking is shown to be about 23%, agreeing with figures in the literature for human muscle work. (Author)

A69-30692 #

THE PRESENTATION OF NAVIGATIONAL INFORMATION.

M. G. Treadgold and D. J. Walters (Ministry of Technology, Royal Aircraft Establishment, Farnborough, Hants., England).

(Institute of Navigation, Ordinary Meeting, London, England, Apr. 25, 1968.)

Institute of Navigation, *Journal*, vol. 22, Apr. 1969, p. 184-192; Discussion, p. 192-197.

Discussion of the display of navigational information in an aircraft. Basic principles of navigation and its mechanization are considered. The "moving map" technique is discussed, and various possibilities are examined for the display of the present position. Current navigation displays are numerous, and are mainly of an electromechanical nature such as compass cards, Doppler Navigation Indicator panels, and the latest ARINC Inertial Navigation panels.

G. R.

A69-30693

REGULATION OF ENERGY BALANCE.

G. R. Herve (Leeds University, School of Medicine, Dept. of Physiology, Leeds, England).

Nature, vol. 222, May 17, 1969, p. 629-631. 34 refs.

Research supported by the Medical Research Council, the University of Sheffield, the University of Aberdeen, Leeds University, and PHS.

Brief review of the problem posed by changes in the food intake of female rats, which are considered to be made in response to changes in energy balance. It is suggested that, because the administration of various steroids leads to marked changes in body weight and fat control, the administered steroid in some way "taps into" the regulation of energy balance and alters the output of the central regulator.

F. R. L.

A69-30753

DRUG THERAPY AND FLIGHT SAFETY.

I. S. Gurin, B. I. Davydov, Ia. N. Divin, E. M. Panova, P. P. Saksonov, and V. G. Terent'ev.

(*Kosmicheskie Issledovaniia*, vol. 6, Sept.-Oct. 1968, p. 782-787.)

Cosmic Research, vol. 6, Sept.-Oct. 1968, p. 658-662. 30 refs.

Translation.

[For abstract see issue 01, page 14, Accession no. A69-10583]

A69-30754

GROWTH STIMULATION OF CERTAIN BIOLOGICAL SPECIMENS SUBJECTED TO VERTICAL VIBRATIONS.

N. L. Delone, V. V. Antipov, E. M. Morozova, P. P. Saksonov, and A. S. Trusova.

(*Kosmicheskie Issledovaniia*, vol. 6, Sept.-Oct. 1968, p. 788-792.)

Cosmic Research, vol. 6, Sept.-Oct. 1968, p. 663-666. 11 refs.

Translation.

[For abstract see issue 01, page 14, Accession no. A69-10584]

A69-30851

ATTENUATION CAPABILITIES OF IMPACT ENERGY.

Abraham L. Lastnik (U.S. Army, Natick Laboratories, Clothing and Organic Materials Laboratory, Natick, Mass.).

Safe Engineering, vol. 3, Feb.-Mar. 1969, p. 10-12, 29. 5 refs.

Results of quality assurance impact testing of the U.S. Army's standard flyer's protective helmet, covering more than 12,000 helmets. Tests revealed factors that influence the impact energy attenuation capabilities of the helmet. The Army's specification requires that the helmet shall sustain two successive impacts in each of four designated sites without bottoming or transmitting an excess of 300 G's to an instrumental headform. Because of the helmet's configuration and construction, the sides exhibit the greatest ability to attenuate impact energy, followed in descending order by the front and rear areas. The distance between the impact center and the edge of the polystyrene foam liner is critical for second-impact attenuation capabilities. A slow-recovery, expanded plastic component of the fitting pad assembly is an essential component of the energy-attenuating system. Absence of this pad will negate the second-impact attenuation capabilities of the helmet. The combined

interaction of the shell, the crushable foam liner, and the slow-recovery plastic pads are required for the helmet to attenuate or dissipate maximum impact loads.

P. v. T.

A69-31000 *

DIFFERENTIAL THERMAL ANALYSIS OF SOME BIOLOGICAL SPECIMENS, PROTEINS, AND STARCHES.

V. I. Oyama (California Institute of Technology, Jet Propulsion Laboratory, Pasadena; NASA, Ames Research Center, Moffett Field, Calif.) and George K. Estok (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.).

Texas Journal of Science, vol. 20, Apr. 1969, p. 355-360.

Dynamic differential thermal analysis (with helium flow) of various dried plant and animal specimens and related substances yields discrete decomposition peaks of the exothermic type. These peaks are suitable as valuable monitors of the pyrolysis process prior to analysis of volatile decomposition products by gas-liquid chromatography. Two main peaks are generally observed - one in the region of 350°, and the other more variable between 450 and 600°. Undifferentiated soil organisms give generally similar patterns, whereas more highly organized plant and metazoan animal forms vary appreciably with phylum.

(Author)

A69-31035 *#

SACCADIC SUPPRESSION.

Whitman Richards (Massachusetts Institute of Technology, Dept. of Psychology, Cambridge, Mass.).

Optical Society of America, Journal, vol. 59, May 1969, p. 617-623. 20 refs.

NIH Grant No. MH-05673; Grant No. NSG-496; Contract No. AF 44(620)-67-C-0085.

Description of measurements of the Stiles-Crawford effect, both before and following eye movements, in order to determine whether or not the retina is sheared during eye movement. An observed shift of the peak of the Stiles-Crawford effect suggests that saccades shear the retina. This action appears to lead to an increase in the retinal activity of a real-light background. Thus thresholds following a saccade are raised the most for test wavelengths which are most similar to the adapting-field wavelength. If the adapting field is eliminated, saccadic suppression is reduced. Saccades also affect the customary rise of thresholds found near the onset and extinction of the adapting field.

M. G.

A69-31044 *

A MULTICHANNEL IMPLANTABLE TELEMETRY SYSTEM.

Thomas B. Fryer, Harold Sandler, and Boris Danow (NASA, Ames Research Center, Moffett Field, Calif.).

Medical Research Engineering, vol. 8, Mar.-Apr. 1969, p. 9-15. 14 refs.

Multichannel telemetry system suitable for chronic implantation in animals, developed to monitor a variety of physiological parameters. A time-sharing multiplex system is used to sample the outputs from several different sensors such as thermistors, EKG electrodes, or pressure cells. The design is such that the number of channels can easily be increased or decreased, depending on requirements of the experimenter. To date, units with five and eight channels have been built and tested. The essential features of small size and low power required for an implantable physiological telemetry system have been achieved without sacrificing accuracy and reliability.

(Author)

A69-31045 *

PHYSIOLOGICAL AND BIOCHEMICAL CHANGES IN BACTERIAL CELLS EXPOSED TO OXYGEN.

Ho Lee Young (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.).

Journal of Bacteriology, vol. 97, Mar. 1969, p. 1498, 1499.

Discussion of the effect of O₂ on the synthesis of cellular materials and on cell size in a resting state, with no net protein syn-

A69-31123

thesis. It is shown that pure oxygen at 1 atm exerts two opposite effects on nitrogen-deficient *Pseudomonas saccharophila* - namely, it inhibits sucrose uptake and lipid synthesis, but it enhances the formation of polysaccharides. M.G.

A69-31123 *

QUALITY ASSURANCE MONITORING OF THE MICROBIOLOGICAL ASPECTS OF THE JPL STERILIZATION ASSEMBLY DEVELOPMENT LABORATORY.

T. R. Gavin, G. H. Redmann, and D. M. Taylor (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). IN: AMERICAN SOCIETY FOR QUALITY CONTROL, ANNUAL TECHNICAL CONFERENCE, 23RD, LOS ANGELES, CALIF., MAY 5-7, 1969, TRANSACTIONS. [A69-31119 15-34] Milwaukee, American Society for Quality Control, Inc., 1969, p. 115-125.

Examination of the Sterilization Assembly Development Laboratory (SADL) program to prevent the introduction of terrestrial microorganisms to other planets by spacecraft. This will be accomplished by assembling such spacecraft capsules in an ultraclean environment to limit biocontamination levels to a maximum of 10^5 spores, and by incorporating a prelaunch dry heat sterilization cycle sufficient to reduce the probability of survival of one microorganism to one chance in 10,000. SADL was designed and constructed to serve as the pilot plant for development of the techniques and procedures necessary to assemble such a capsule and to microbiologically assay, sterilize, and certify that it has satisfied the NASA planetary quarantine requirements. F.R.L.

A69-31124

MICROBIOLOGY QUALITY ACTIVITIES FOR A PLANETARY MISSION.

James E. Cole (Martin Marietta Corp., Quality Assurance Dept., Denver, Colo.). IN: AMERICAN SOCIETY FOR QUALITY CONTROL, ANNUAL TECHNICAL CONFERENCE, 23RD, LOS ANGELES, CALIF., MAY 5-7, 1969, TRANSACTIONS. [A69-31119 15-34] Milwaukee, American Society for Quality Control, Inc., 1969, p. 129-137.

Description of the activities for which the quality assurance organization must assume responsibility in order to ensure that the NASA program to avoid planetary microbiological contamination is effective. The planning and implementation of controls that meet the sterilization requirements, considered as an inherent part of the total quality assurance program, are dealt with. Attention is given to program-peculiar requirements, design and development controls, procurement controls, fabrication and test, and microbiology activities at the launch site. F.R.L.

A69-31225

MEDICAL ASPECTS OF FUTURE MASS AIR TRANSPORT [MEDIZINISCHE ASPEKTE DES MASSENFLUGVERKEHRS VON MORGEN].

E. A. Lauschner (Bundesministerium der Verteidigung, Deutsche Luftwaffe, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany).

Therapeutische Berichte, vol. 40, no. 165, 1968, p. 165-171. In German.

Summary of the findings of the FAUSST committee (French-Anglo-U.S. Supersonic Transport), relating to problems associated with mass transport by supersonic aircraft. The areas investigated include effects on both the aircraft and passengers, and cover such categories as radiation, ozone toxicity, sudden pressure drops, temperature, humidity and internal cabin pressure, time-zone physiology, air sickness, and crew fitness. The physiological and psychological effects of sonic boom on the general population are discussed, and it is hoped that both engineers and airlines will pool all their available knowledge to dampen sonic boom to levels which are tolerable and acceptable to the general public. B.H.

A69-31228

TELEMETRY IN INDUSTRIAL AND EFFICIENCY MEDICINE WITH SPECIAL CONSIDERATION OF PULSE RATE MEASUREMENT [DIE TELEMETRIE IN DER ARBEITS- UND LEISTUNGSMEDIZIN UNTER BESONDERER BERÜCKSICHTIGUNG DER PULSFREQUENZMESSUNG].

H. W. Kirchhoff and R. O. Amendt (Bundesministerium der Verteidigung, Deutsche Luftwaffe, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany).

Wehrmedizinische Monatsschrift, vol. 13, Mar. 1969, p. 66-71. In German.

Discussion of telemetric techniques, based on pulse-rate measurements, which make it possible to monitor the state of human beings under their natural working conditions. This technique makes it possible to gain new knowledge concerning the changes in the physiological functions of humans. Several examples are presented, taken from the sectors of industrial medicine, sports medicine, and efficiency medicine. It is stressed that, in order to promote the application of telemetry to functional diagnostics, it will be necessary to develop sophisticated and varied sensor elements, since telemetry can be used to good advantage only when a large number of measured variables are transmitted simultaneously. P.v.T.

A69-31229

IN-FLIGHT TELEMETRY OF BLOOD PRESSURE [DIE TELEMETRIE DES BLUTDRUCKES AUS DEM FLUGZEUG]

L. Pircher (Eidgenössisches Militärdepartement, Schweizerische Luftwaffe, Fliegerärztliches Institut, Dübendorf, Switzerland).

Wehrmedizinische Monatsschrift, vol. 13, Mar. 1969, p. 75-77. In German.

Discussion of the possibilities opened by telemetry to make important measurements of blood pressure during flight. The application of indirect measurements (cuff) permits measurements of blood pressure to be carried out even within the scope of normal flying. Valuable results are thus obtained both for the evaluation of circulatory processes and for the determination of psychophysical relations. P.v.T.

A69-31230

RESPIRATORY VOLUME MEASUREMENTS WITH PYROELECTRIC CONDUCTOR SENSORS [MESSUNG DES ATEMVOLUMENS MIT HEISSELEITERSENSOREN].

W. Buck (Bundesministerium der Verteidigung, Deutsche Luftwaffe, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany).

Wehrmedizinische Monatsschrift, vol. 13, Mar. 1969, p. 88-90. In German.

Description of a method which permits continuous measuring and recording of the air volume inhaled during chosen time intervals. A pyroelectric conductor, inserted into a respiratory mask, serves as a sensor for these measurements and forms part of a bridge circuit. The integration of the starting signal of this measuring bridge during each phase of inhaling produces a voltage, which is proportional to the inhaled air volume and is recorded by a measuring instrument or by a recorder. P.v.T.

A69-31231

SENSOR FOR O₂ PARTIAL PRESSURE TELEMETRY [MESSFÜHLER FÜR DIE TELEMETRIE DES O₂-PARTIALDRUCKES].

O. Harth, H. Guttzeit, H. R. Vogel, and G. Thews (Mainz, Universität, Physiologisches Institut, Mainz, West Germany).

Wehrmedizinische Monatsschrift, vol. 13, Mar. 1969, p. 91-94. 6 refs. In German.

Description of a small lightweight sensor for recording the oxygen partial pressure in respiration air. This device, which permits even nonstationary measurements, is a miniaturized, membrane-covered, polarographic measuring arrangement with a platinum electrode. The adjustment time for the final stationary measurement readings after an abrupt change in the oxygen partial pressure in the test gas amounts to less than 0.2 sec. The calibration curve is linear. It is possible with this measuring device to continuously determine changes in the oxygen partial pressure during the expiration stage. P.v.T.

A69-31232

TELEMETRIC EEG STUDIES DURING HIGH-PERFORMANCE SITUATIONS [TELEMETRISCHE EEG-UNTERSUCHUNGEN IN LEISTUNGSSITUATIONEN].

H. Legewie, O. Simonova, and O. D. Creutzfeldt (Max-Planck-Institut für Psychiatrie, Abteilung für Neurophysiologie, Munich, West Germany).

Wehrmedizinische Monatsschrift, vol. 13, Mar. 1969, p. 95-101. 14 refs. In German.

Discussion of the problems and possibilities of routine EEG recording, with emphasis on a suitable and economical computer analysis of the EEG. As an example of such use, two model studies are presented, in which EEG criteria are determined under clearly defined rest and performance conditions. It was found, as the most significant result of these two studies, that mental tension is not generally associated with desynchronization of the EEG. P. v. T.

A69-31233

THE IMPORTANCE OF THE EEG FOR AVIATION MEDICINE WITH PARTICULAR CONSIDERATION OF TELEMETRIC IN-FLIGHT LEADS [DIE BEDEUTUNG DES EEG FÜR DIE FLUGMEDIZIN MIT BESONDERER BERÜCKSICHTIGUNG TELEMETRISCHER INFLIGHT-ABLEITUNGEN].

J. C. Aschoff (Ulm, Universität, Abteilung für Neurologie, Ulm, West Germany).

Wehrmedizinische Monatsschrift, vol. 13, Mar. 1969, p. 102-106. 20 refs. In German.

Discussion of Sem-Jacobsen's (1958, 1959, 1960, 1963) success in establishing a relation between EEG and flight performance in pilots. For this purpose, the EEG is measured telemetrically during a standardized flight program from a ground station. Paroxysmal delta and theta patterns during particularly strenuous flight stages (6 G) occur frequently in accident-prone pilots and indicate a disorder of cerebral functions under high stress. Jet aircraft accidents, which in more than 50% of the cases are due to human failure, could be reduced by half, if an in-flight EEG were performed on all jet pilots at the beginning of their training and if admission to jet training depended on the results of the in-flight EEG. To replace the in-flight EEG by centrifuge EEGs under simulated flight-stress conditions is now under consideration. P. v. T.

A69-31306 * #

INTEGRATION OF EXPERIMENTS FOR THE DETECTION OF BIOLOGICAL ACTIVITY IN EXTRATERRESTRIAL EXPLORATION.

E. L. Merek and V. I. Oyama (NASA, Ames Research Center, Moffett Field, Calif.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 16 p. 8 refs.

Description of a unified device for detecting extraterrestrial life. The device can detect growth and catabolic and anabolic activity on a single sample. Growth is monitored in a liquid medium which is in contact with, and chemically influenced by, a relatively large sample. Catabolic activity is indicated by changes in the gas composition of the atmosphere above the sample. Anabolic activity is indicated by the appearance of reduced carbon compounds, from oxidized precursors, in the liquid medium. A schematic diagram is given of the components of the integrated device. M. G.

A69-31315 * #

THE DETECTION OF OPTICAL ASYMMETRY IN BIOGENIC MOLECULES BY GAS CHROMATOGRAPHY FOR EXTRATERRESTRIAL SPACE EXPLORATION - SAMPLE PROCESSING STUDIES. G. E. Pollock, A. K. Miyamoto, and V. I. Oyama (NASA, Ames Research Center, Moffett Field, Calif.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 18 p. 9 refs.

Investigation of a method of life detection for space missions, based on the detection of optical asymmetry in molecules by a gas chromatographic technique involving the synthesis of diastereomeric esters [(+)-2-butyl derivatives of amino acids]. A scheme for isolating, purifying, and derivatizing amino acids from soils has been devised and applied to rich and poor soils alike. Since the operations involved are simple, as shown schematically, the utility of automated wet chemical approaches in space exploration is a distinct possibility. G. R.

A69-31321 * #

RADIOBIOLOGICAL STUDIES OF PLANTS ORBITED IN BIO-SATELLITE II.

L. A. Schairer, A. H. Sparrow, and K. M. Marimuthu (Brookhaven National Laboratory, Dept. of Biology, Upton, N. Y.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 10 p. 5 refs.

AEC-supported research; NASA Contract No. R-104-7.

Investigation of the effects of the space environment on spontaneous and radiation-induced mutation rates and on cytological changes in *Tradescantia* clone 02. Plants were carried by the Biosatellite 2 for a two-day orbital flight during which a part of them was subjected to gamma radiation from an onboard 85 strontium source. The plants were studied after the flight, and the results were compared with tests on plants kept on the ground. Analysis of data on somatic mutation, cell size, and chromosome aberration endpoints showed no significant differences between flight and nonflight samples. However, pollen abortion, frequency of micronuclei in pollen, and loss of reproductive integrity showed increases associated with weightlessness in irradiated material. G. R.

A69-31325 #

THE DETECTION OF IRON PORPHYRIN PROTEINS BY THE METHOD OF BIOCHEMILUMINESCENCE IN THE SEARCH FOR EXTRA-TERRESTRIAL LIFE.

G. G. Sotnikov (Akademiia Nauk SSSR, Institut Mikrobiologii, Moscow, USSR).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 20 p. 19 refs.

Study of the possibility of using the bioluminescent luminol-peroxide reaction for determining porphyrin-containing proteins in microorganisms. It is shown that the kinetics of the reaction with porphyrin-containing proteins differ both in signal intensity and in the duration of the drop in chemiluminescence from the kinetics of the reaction with nonheme type catalysts. A method is described which provides an authentic signal only after 13 hr of incubating microflora in a nutrient medium. The dynamics of the bioluminescent signal after inoculating the culture medium with desert soil are shown graphically. M. G.

A69-31330 * #

DIURNAL RHYTHM OF THE PITUITARY-ADRENOCORTICAL RESPONSE TO STRESS - EFFECT OF CONSTANT LIGHT AND CONSTANT DARKNESS.

Joan Vernikos-Danellis, C. M. Winget, and N. W. Hetherington (NASA, Ames Research Center, Moffett Field, Calif.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 14 p. 15 refs.

Results of a study undertaken to describe the existence of a diurnal rhythm in the hypothalamic-pituitary-adrenocortical system before and after stress in female rats kept under controlled environmental conditions. The time pattern in the response to stress was determined at 4-hr intervals during a 24-hr period in which plasma ACTH and plasma corticosterone were measured at different time intervals. The stress response varied considerably with time of day in both magnitude and duration. The adrenals of rats exposed to constant light for 45 days atrophied, whereas the adrenals of animals kept in constant dark for the same period did not differ significantly from control animals kept in 12 hr light and 12 hr dark. The increase in plasma ACTH in response to stress was greater both in the animals maintained in constant light and in constant dark than in the control group. Homeostatic mechanisms involved in these changes are discussed. M. G.

A69-31336 * #

MECHANISMS OF ACTION OF LIGHT ON CIRCADIAN RHYTHMS IN THE MONKEY.

C. M. Winget, L. S. Rosenblatt, C. W. DeRoshia, and N. W. Hetherington (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 25 p. 18 refs.

A69-31344

Description of changes in deep body temperature (DBT) and locomotor activity (LMA) phase relationships as well as alterations in the DBT waveform in response to changing photoperiods in two species of subhuman primates (*Macaca nemestrina* and *Cebus albifrons*). It has been demonstrated that DBT and LMA rhythmicity are stable in the subhuman primate. Asymmetrical DBT waveforms retained their inherent shapes over a relatively long time period and were perhaps entrained to the 12L:12D cycle. Maxima were exhibited during light and minima in the dark with a range of oscillation in DBT of 2 to 3°C.

G.R.

A69-31344

BIOMEDICAL INVESTIGATIONS PERFORMED IN THE USSR DURING 1968 AND THE BEGINNING OF 1969 ACCORDING TO A PROGRAM OF SPACE STUDY AND MASTERY [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIYA, PROVEDENNYE V SSSR V TECHENIE 1968 g. I NACHALA 1969 g. PO PROGRAMME ISSLEDOVANIYA I OSVOENIYA KOSMICHESKOGO PROSTRANSTVA].

V. V. Parin (Akademiia Nauk SSSR, Moscow, USSR) and O. G. Gzenko.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 21 p. In Russian.

Discussion of investigations aimed at determining the admissible radiation doses for space crews and at developing adequate protection from ionizing radiation. A long-term experiment is described in which 180 dogs were exposed to gamma-radiation over a period of several years, at radiation doses corresponding to the constant action of galactic cosmic rays (25 to 150 rem per year) and repeated solar corpuscular radiation (single radiation doses ranging from 10 to 50 rem). The biological effects observed are discussed. Some of the dogs exposed to yearly radiation doses ranging from 150 to 225 rem exhibited many symptoms of the early stage of chronic radiation sickness. The radiation doses recorded in the Soyuz 3, 4, and 5 space vehicles and in the atmosphere during these flights are examined.

V.P.

A69-31354

EFFECT OF HIGH VACUUM ON OXIDATIVE PROCESSES IN BACTERIA AS WELL AS ON ACTIVITY OF CERTAIN ENZYMES.

A. A. Inshenetskii, S. V. Lysenko, and G. S. Komolova (Akademiia Nauk SSSR, Moscow, USSR).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 10 p.

Investigation of the effect of 72-hr exposure to high vacuum (10^{-8} - 10^{-9} mm Hg) on spores of *Bacillus simplex*, cells of *Sarcina flava*, and certain enzymes. The enzymes investigated included catalase, ribonuclease, α -amylase, trypsin, and urease. It was found that microorganisms can not only survive 72-hr of exposure to high vacuum, but some of their physiological activities are preserved.

G.R.

A69-31368

AN EFFECT OF WEIGHTLESSNESS FOLLOWING EXPOSURE TO VIBRATION.

Stephen W. Gray and Betty F. Edwards (Emory University, Atlanta, Ga.)

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 7 p. 10 refs.

Study of the effects of weightlessness and vibration on seedlings of a soft red winter wheat. It was found that vibration alone doubles the number of malformed seedlings, while vibration, followed by growth on the clinostat or in orbital weightlessness, decreases the number of deformed plants below that found in control plants. Weightlessness alone appears to have little effect.

G.R.

A69-31388

SURVIVAL OF MICROORGANISMS UNDER SIMULATED SPACE CONDITIONS.

H. Bückner and G. Horneck (Frankfurt, Universität, Arbeitsgruppe für biophysikalische Weltraumforschung, Frankfurt am Main, West Germany).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 9 p. 15 refs.

Research supported by the Bundesministerium für Wissenschaftliche Forschung.

Monocellular layers of stationary phase cells of *Escherichia coli* B/r were exposed to high vacuum (up to 10^{-6} torr) at different temperatures. After simultaneous irradiation with UV (at 254 nm) or X-rays, the survival was tested as the colony forming ability. In vacuum, the sensitivity to UV and X-rays was enhanced compared with the controls at atmospheric pressure.

(Author)

A69-31408

SOME ASPECTS OF UTILIZATION OF HIGHER PLANTS AS NUTRIENT SOURCE IN SPACE MISSIONS.

V. G. Chuchkin, V. I. Rozhdestvenskii, V. N. Golovin, K. S. Arbuzova, I. V. Tsvetkova, and A. V. Kostetskii.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 4 p.

Comparison of the weight requirement for equipment used for cultivating higher plants and for storing food for a ten-man space mission lasting five years. The estimation was made for wheat, potatoes, cabbage, kale, tomatoes, carrots, and beet. It is shown that the raising of higher plants has weight advantages over systems based on storage of food and physicochemical air regeneration.

P.G.

A69-31444

DRY HEAT DESTRUCTION RATES FOR MICROORGANISMS ON OPEN SURFACES, IN MATED SURFACE AREAS AND ENCAPSULATED IN SOLIDS OF SPACECRAFT HARDWARE.

I. J. Pflug (Minnesota, University, College of Medical Sciences, School of Public Health, Minneapolis, Minn.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 9 p. 11 refs.

Discussion of D-values for the dry heat destruction of microorganisms on spacecraft hardware. Three types of microorganisms are treated: (1) encapsulated microorganisms, (2) microorganisms on surfaces, and (3) microorganisms in mated surface areas. Each of these three classifications is defined and discussed, and the physical conditions which are responsible for the different D-values are described. It is concluded that temperature and the water condition in the spore are the major factors that determine the D-value. The temperature coefficient, in the range of temperatures used in sterilization of spacecraft hardware, is 21°C. In sterilizing spacecraft hardware, the location of the microorganisms (encapsulated on surfaces or in mated surface areas) determines the rate of water and/or final water condition of the spore, and as such, has a major effect on the D-value. It is suggested that the D-values can be reduced using low-moisture assembly conditions, a postassembly drying cycle, and very dry gas during the terminal sterilization cycle.

M.G.

A69-31457

PROBLEMS OF LATENT DESYNCHRONOSIS.

B. S. Aliakrinskii.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 14 p.

Discussion of phase relationships in the control of a life system and their distortion (desynchronization). Body rhythms and their coordination are considered, and studies of circadian rhythms are reported. Cases of desynchronization are described, and a classification of its causes is presented. The term "latent desynchronization" is defined in connection with findings concerning difficulties in the adaptation to a new system of time. The consequences of latent desynchronization are then considered.

G.R.

A69-31458 #**DIURNAL RHYTHMS AND IONIZING RADIATION EFFECTS.**

Iu. G. Grigor'ev, N. G. Darenskaia, Iu. P. Druzhinin, S. S. Kuznetsova, and V. M. Seraia.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 8 p. 10 refs.

Study of diurnal variations in the radiation sensitivity of mice and rats. It was found that the pattern of sensitivity variations (in response to irradiation with median lethal doses) in nonbred mice and rats, as judged by their survival, is close to the sine curve with two periods attained during 24 hours. Variations in the survival of animals lie within 50%. The pattern of diurnal variations of sensitivity seems to depend on the "map of phases" of experimental animals, L:D ratio, and seasonal variations. However, diurnal rhythmicity of sensitivity remains unaltered when the animals are maintained on a shortened 6L:6D cycle and different feeding patterns. Early stages of the rearrangement of circadian rhythms to adjust to this cycle (11-25 days) are accompanied by increased radiation sensitivity of animals.

G. R.

A69-31459 *#**FOOD TECHNOLOGY PROBLEMS RELATED TO SPACE FEEDING.**

H. A. Hollender, Mary V. Klicka (U.S. Army, Natick Laboratories, Natick, Mass.), and M. C. Smith (NASA, Houston, Tex.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 19 p. 7 refs.

Discussion of technological problems connected with feeding the astronaut in space, and summary of NASA criteria for space foods. Except for contingency purposes, these criteria eliminated foods in metal tubes and directed development effort to the dehydrated foods. Two approaches to the use of dehydrated foods were pursued. Bite-size foods (to be eaten dry) and precooked dehydrated foods (to be reconstituted with water by the astronaut before consumption) were developed. The subjects discussed include thermostabilized wet meat products, packaging, human factors, and controls on food production and development.

G. R.

A69-31460 #**SPECIFIC PROBLEMS OF PHYSICAL TRAINING OF COSMONAUTS.**

Z. Jethon (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 10 p. 8 refs.

Discussion of the possibility of increasing the tolerance of cosmonauts to the space environment by means of physical exercises. Experimental results are reported which suggest that suitable physical training is effective not only in developing the capacity to resist acceleration, but may improve hypoxia tolerance and high-altitude acclimatization for acceleration tolerance.

F. R. L.

A69-31461 #**THE EFFECTS OF ELECTRIC FIELDS ON CIRCADIAN RHYTHMICITY IN MEN.**

R. Wever (Max-Planck-Institut für Verhaltensphysiologie, Seewiesen über Starnberg, West Germany).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 10 p. 15 refs.

Study of circadian rhythms in men, using an underground bunker in which human subjects were isolated from the environment for three to eight weeks. One of the two experimental rooms was shielded against magnetic and electric fields. It was found that the mean-periodic value is lower in the nonshielded room than in the shielded room. Artificial constant fields, electric and magnetic, do not influence human circadian rhythms, but a weak electric field, alternating at 10 cps, affects human circadian rhythms in the same manner as the total of the natural fields.

F. R. L.

A69-31462 #**PROBLEMS OF SPACE NUTRITION OF MAN.**

A. A. Pokrovskii and A. S. Ushakov.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 6 p.

Attempt to establish the human requirements for nutrients under stress conditions developed in response to the effect of space flight factors. It appears that the most realistic way to assure proper nutrition in both short- and longer-duration (up to several years) space flights is to have stored foods on board the vehicle. Synthetic food can be used, and their advantages are outlined. The possibilities of hothouse plants are considered.

F. R. L.

A69-31468 #**CALCIUM METABOLISM IN SPACE FLIGHT.**

William F. Neuman (Rochester, University, School of Medicine and Dentistry, Dept. of Radiation Biology and Biophysics, Rochester, N. Y.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 11 p. 15 refs.

AEC-sponsored research.

Immobilization has been repeatedly shown to induce a loss of skeletal substance accompanied by hypercalcemia and hypercalcuria. Older data from paraplegics, polio patients, fracture patients, and immobilized normal volunteers are reviewed. More recent studies of bone densitometry on normal volunteers and astronauts of Gemini IV, V, and VII are reported briefly. Finally, metabolic balance studies from Gemini VII are summarized. The balance data suggest that adequate calcium intake and programmed exercise may control the problem of calcium mobilization. However, there are disquieting discrepancies between the densitometric results (which show bone losses) and the balance data (which show no bone loss). Either the densitometric results are in error or there occur alarming intraskeletal transfers of bone mineral not detected by the balance approach.

(Author)

A69-31469 #**CIRCADIAN RHYTHM AS RESPONSE TO THE COMPULSORY CONSTANT CONDITIONS.**

V. B. Chernyshev.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 3 p.

Description of an experiment designed to study circadian rhythm in dermestid beetles *Trogoderma glabrum* Herbst. It is shown that circadian rhythm can result from abnormal constant light and temperature conditions. It is assumed that the general characteristics of such rhythm may be explained as a behavioral response to the constant conditions.

M. G.

A69-31470 #**EVALUATION OF FOODS FOR SPACE FLIGHTS.**

John E. Vanderveen (USAF, School of Aerospace Medicine, Aerospace Medical Div., Brooks AFB, Tex.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper. 13 p. 6 refs.

Discussion of the evaluation of proposed foods for space flights, using metabolic balance techniques under conditions which simulate as nearly as possible actual space flights. The metabolic balance studies included balances for energy, nitrogen, calcium, phosphorus, sodium, potassium, chloride, magnesium, and water. In addition, the digestibility of fat and fiber were measured. A study of food consumption during weightlessness is described.

M. G.

A69-31471

A69-31471

SYNTHETIC MONOSACCHARIDES FOR NUTRITION OF MAN IN SPACE.

A. M. Ugolev, B. A. Adamovich, O. V. Krylov, Iu. E. Siniak, V. A. Uspenskaia, and I. L. Shulgina.

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 6 p. 11 refs.

Study of the possibility of producing monosaccharides from carbon dioxide expired by man or released during human waste incineration in accordance with the scheme: wastes - carbon dioxide - methane - formaldehyde - monosaccharides. The conditions for waste oxidation, nitric oxide production from urine, synthesis of formaldehyde, and its condensation to sugars are established. The toxicological evaluation of synthetic monosaccharides showed no toxic effect of the products obtained. G. R.

A69-31472 *

SPACECRAFT STERILIZATION BY DESTRUCTIVE HEATING.

Byron L. Swenson (NASA, Ames Research Center, Moffett Field, Calif.) and Lawrence B. Hall (NASA, Washington, D.C.).

COSPAR, Plenary Meeting, 12th, Prague, Czechoslovakia, May 11-24, 1969, Paper, 15 p.

Study of the problem of sterilization of spacecraft by destructive heating before entering a planet's atmosphere. It is concluded that a spacecraft can theoretically be sterilized in space by heating to destruction with thermite or similar agents, but heavy weight and design penalties must be accepted. A danger of contamination lies in microbes entrapped within plastic pieces surviving entry, since the low diffusivity of such materials protects them from experiencing high internal temperatures. Z. W.

A69-31539 *

IDENTIFICATION OF SUGARS AS THEIR TRIFLUOROACETYL POLYOL DERIVATIVES.

Jacob Shapira (NASA, Ames Research Center, Biotechnology Div., Moffett Field, Calif.).

Nature, vol. 222, May 24, 1969, p. 792, 793. 14 refs.

Description of a method which successfully solves the problems inherent in the identification of mixtures of sugars by gas-liquid chromatography (GLC). The method involves the sodium borohydride reduction of the sugar or sugar mixture to the corresponding polyol(s) and GLC of the trifluoroacetyl derivative. G. R.

A69-31551 *

EFFECT OF MANGANESE DEFICIENCY ON GROWTH AND CHLOROPHYLL CONTENT OF ALGAE WITH AND WITHOUT HYDROGENASE.

Erich Kessler (Florida State University, Institute of Molecular Biophysics, Dept. of Biological Science, Tallahassee, Fla.).

Archiv für Mikrobiologie, vol. 63, 1968, p. 7-10. 14 refs. Grant No. NGR-10-004-018.

Results of an investigation of manganese deficiency in algae without hydrogenase, showing that they become rapidly chlorotic under manganese-deficient conditions, in agreement with the reaction of higher plants. By contrast, the chlorophyll of algae which contain hydrogenase, is much more stable in the absence of manganese. M. M.

A69-31552 *

STERILE SOIL FROM ANTARCTICA - ORGANIC ANALYSIS.

N. H. Horowitz, A. J. Bauman, R. E. Cameron, P. J. Geiger, J. S. Hubbard, G. P. Shulman, P. G. Simmonds, and K. Westberg (California Institute of Technology, Jet Propulsion Laboratory, Space Sciences Div., Pasadena, Calif.).

Science, vol. 164, May 30, 1969, p. 1054-1056. 17 refs.

Investigation of soils from the dry-valley region of Antarctica. It was found that they can be sterile by the usual microbiological criteria and yet contain significant amounts of organic carbon. Examination of one such soil shows that the organic material is finely divided anthracite coal. These findings have significant implications for the biological exploration of Mars. P. G.

A69-31555 *

COMPLEX SYNAPTIC CONFIGURATIONS IN PLANARIAN BRAIN.

J. B. Best and J. Noel (Colorado State University, Dept. of Physiology and Biophysics, Fort Collins, Colo.).

Science, vol. 164, May 30, 1969, p. 1070, 1071. 11 refs.

NIH Grant No. MH-07603; Grant No. NSG-625.

Complex synaptic configurations which appear to have special evolutionary and functional significance are shown in the neuropil of the brain of the planarian *Dugesia dorotocephala*. Some of the endings in these synaptic attachments contain dense core vesicles, suggesting that nonadrenaline or serotonin or both are neurotransmitters at a more primitive phyletic level than reported hitherto. The spatial proximity and connectivity of the synapses suggest modes of action permitting greater functional complexity to the planarian brain than previously supposed. Closely adjacent cellular processes which contain polysomal ribosomes, unusual in the neuropil, suggest synaptic transmission-protein synthesis coupling and a possible role in memory. (Author)

A69-31556

OBJECTIVE MEASURE OF THE DYNAMICS OF A VISUAL MOVEMENT ILLUSION.

John Thorson, G. David Lange, and Marguerite Biederman-Thorson (California, University, School of Medicine, Dept. of Neurosciences, La Jolla, Calif.).

Science, vol. 164, May 30, 1969, p. 1087, 1088. 7 refs.

USAF-Navy-NIH-NSF-supported research.

Description of experiments dealing with the apparent movement in peripheral vision which can be induced by sequential flashing of two dots that are spatially unresolved. Subjects used this illusion to make forced-choice estimates of the directional sequence of the two dots. Performance of this task defines spatiotemporal conditions that induce the illusion without reliance upon subjective distinctions of "movement" from "successivity" and "simultaneity." The dynamics of the illusion, defined in this way, are measured and compared with those for after-flash inhibition and the perception of real movement. P. G.

A69-31864 *

ELECTRON MICROSCOPY OF A HEMAGGLUTININ FROM LIMULUS POLYPHEMUS.

H. Fernandez Moran (Chicago, University, Dept. of Biophysics, Chicago, Ill.), J. J. Marchalonis, and G. M. Edelman (Rockefeller University, New York, N. Y.).

Journal of Molecular Biology, vol. 32, 1968, p. 467-469. 7 refs.

Research supported by the L. Block Fund and the University of Chicago; NIH Grants No. GM-13243; No. AM-04256; NSF Grant No. GB-6546; AEC Contract No. AT (11-1)-1344; Grant No. NSG-441-63.

Discussion of macromolecular components with ring-shaped structures, previously observed in the hemolymph of *Limulus polyphemus*. The ring-shaped macromolecular components had diameters of about 100 Å, and the height of the molecules was tentatively estimated to be 65 Å. Electron microscopic evidence is presented which indicates that the ring structures correspond to *Limulus* hemagglutinin. M. G.

A69-31930

ARTIFICIAL GRAVITATION ON SPACECRAFT [ISKUSTVENNAIA GRAVITATSIIA NA KOSMICHESKIKH KORABLIKH].

A. Volkov, E. Zav'ialov, and V. Kopanev.

Aviatsiia i Kosmonavtika, May 1969, p. 36, 37, 47. In Russian.

Interpretation, geared to the popular level, of the problem of weightlessness. A number of difficulties arising from the state of weightlessness are described, together with the recent experiences of astronauts in this field. The main problems concerning artificial gravitation produced by rotation of the spacecraft are discussed (gravitational gradient, Coriolis force). Taking the Coriolis force into account, it is concluded that the lower limit of artificial gravitation should be at least 0.277 g for a rotational radius of 24 m and a rotational velocity of 1.2 m/sec. P. G.

A69-32008

AEROSPACE MEDICAL ASSOCIATION, ANNUAL SCIENTIFIC MEETING, SAN FRANCISCO, CALIF., MAY 5-8, 1969, PRE-PRINTS.

Washington, D.C., Aerospace Medical Association, 1969. 253 p. Members, \$5.00; nonmembers, \$8.00.

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DETERMINATION OF CENTERS OF GRAVITY OF INFANTS. J. J. Swearingen, J. M. Badgley, G. E. Braden, and T. F. Wallace (Federal Aviation Administration, Oklahoma City, Okla.), p. 235, 236.

CONGENITAL AND ACQUIRED SPINAL ABNORMALITIES IN NAVAL FLIGHT STUDENTS. P. C. Gregg (U.S. Naval Aviation Medical Center, Pensacola, Fla.), p. 237, 238.

DIMETHYL SULFOXIDE AS AN AID IN WHOLE ANIMAL PRESERVATION. G. J. Goble and J. T. Wilson, Jr. (Lockheed Aircraft Corp., Palo Alto, Calif.), p. 239, 240.

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SATELLITE TRANSMISSION OF ELECTROPHYSIOLOGICAL DATA FOR REAL-TIME ANALYSIS [TRANSMISSION DE DONNEES ELECTROPHYSIOLOGIQUES PAR SATELLITE POUR ANALYSE EN TEMPS REEL].

C. Gaudeau, F. Neel (Centre National de la Recherche Scientifique, Institut Blaise Pascal, Laboratoire de Recherches Avancées en Moyens Informatiques, Paris, France), J. Thouvenot (Orléans, Université, Faculté Mixte de Médecine et de Pharmacie, Tours, France), and A. Martin (Centre Hospitalier Régional, Service de Psychiatrie, Tours, France).

L'Aéronautique et l'Astronautique, no. 10, 1969, p. 32-36. In French.

Results of an experiment conducted in real-time processing of medical data by a computer center. Two sets of data were processed: (1) telex transmission at 50 bauds from Tours to Paris of electrophysiological numerical cardiological data, and (2) a new type of electrophysiological data called an "electrosplanchnogram," or a recording of visceral abdominal activity, primarily of the digestive tract. The importance of such transmissions by teletype as an aid to medical observation and diagnosis is discussed. B.H.

A69-32435**SPACE CRAFT STERILIZATION.**

Philip R. Austin.

Contamination Control, vol. 8, June 1969, p. 9-12.

Discussion of planetary quarantine constraints established by NASA to ensure a low probability of contamination resulting from extraterrestrial biological exploration. Four prime sources of contamination are considered: (1) the launch vehicle, (2) the planetary vehicle, (3) the orbiting spacecraft, and (4) the sterilized lander capsule. Contamination probability equations suitable for use with planetary missions are given, and sterilization procedures for planetary landing vehicles are outlined. Analytic concepts for establishing sterilization process parameters are shown to be feasible, although the exact quantitative relationship between particulate contamination levels and microbial contamination levels has not yet been established.

B.H.

A69-32444**TIME-ZONE EFFECTS.**

Peter V. Siegel, Siegfried J. Gerathewohl, and Stanley R. Mohler (Federal Aviation Administration, Washington, D. C.).

(American Association for the Advancement of Science, Meeting, New York, N. Y., Dec. 30, 1967.)Science, vol. 164, June 13, 1969, p. 1249-1255. 51 refs.

Discussion of the adverse effects of disrupted circadian rhythms during long-distance air flights. Different circadian physiological cycles are described together with the effects of shifts in the light-dark ratio. Circadian-rhythm desynchronization in air crews is studied, and a time-zone nomograph is given. Methods are considered for lessening the effects of desynchronization in circadian periodicities.

G.R.

A69-32447 ***CIRCADIAN RHYTHM IN MAMMALIAN BODY TEMPERATURE ENTRAINMENT BY CYCLIC PRESSURE CHANGES.**

Page Hayden and Robert G. Lindberg (Northrop Corp., Northrop Corporate Laboratories, Medical Systems Laboratory, Hawthorne, Calif.).

Science, vol. 164, June 13, 1969, p. 1288, 1289. 21 refs.

Contract No. NASw-812.

Investigation of the effect of pressure cycles on the circadian rhythm in the body temperature of pocket mice (*Perognathus longimembris*). It was found that a 24-hr cycle of pressure can act as a zeitgeber to entrain the endogenous circadian rhythm of body temperature in pocket mice under constant conditions of environmental temperature and light.

G.R.

A69-32448**DARK ADAPTATION - AN INTEROCULAR LIGHT-ADAPTATION EFFECT.**

Theron G. Lansford (Tri-State College, Angola, Ind.) and Howard D. Baker (Florida State University, Dept. of Psychology, Tallahassee, Fla.).

Science, vol. 164, June 13, 1969, p. 1307-1309. 8 refs.

NSF Grant No. GY-2378.

Study of adaptation to darkness showing that the light adaptation in one eye appears to increase the rate of subsequent dark adaptation in the other eye. Presentation of light to the left eye simultaneously with adaptation of the right eye to light may accelerate dark adaptation in the right eye. The result is that the rod-cone-break and the final threshold of the rods are achieved earlier than when the right eye alone is adapted to light.

G.R.

A69-32605**NERVOUS MECHANISMS OF VESTIBULAR REACTIONS [NERVNYE MEKHANIZMY VESTIBULIARNYKH REAKTSII].**

A. N. Razumeev and A. A. Shipov.

Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 10), 1969. 343 p. 451 refs. In Russian.

This volume, another in the series of "Problems in Space Biology," examines the advances which have been made during the past few years in electrophysiological investigations of the individual links of the vestibular analyzer tracts, the interaction between the vestibular analyzer subsystems, the nature of the receptor pulses, and the behavior of these pulses during the passage through the vestibular tract. Particular attention is given to the mathematical description of the principles of operation of the peripheral sections of the vestibular analyzer, the modeling of the activity of the oculomotor apparatus, and the mathematical treatment of the changes in neuron rhythmicity in various regions of the cerebral cortex and subcortical formations associated with irritations of the vestibular apparatus. The book is intended to serve physiologists, otolaryngologists, and engineers dealing with the modeling of physiological functions.

V. P.

A69-32764 #**A STATUS REPORT ON COMMUNITY NUISANCE.**

G. P. Sallee (American Airlines, Inc., New York, N. Y.).

American Institute of Aeronautics and Astronautics, Propulsion Joint Specialist Conference, 5th, U.S. Air Force Academy, Colorado Springs, Colo., June 9-13, 1969, Paper 69-489. 10 p. Members, \$1.00; nonmembers, \$1.50.

Discussion of what is being done today and what is planned for the future to alleviate the noise problem and reduce the level of smoke emission from aircraft engines. Work being done at American Airlines to reduce the level of noise to which communities surrounding airports are exposed is described. As an example, the takeoff noise abatement procedures put into use at a major New York airport are discussed. Economic and performance penalties imposed by noise reduction programs and airline participation in various airline/industry/government noise abatement activities are discussed. The activities of the airlines and the aircraft engine manufacturers in reducing the levels of smoke emission are described. The status of current efforts to reduce smoke emissions is reviewed for current and future aircraft.

(Author)

A69-32788**THE EFFECTS OF HIGH INTENSITY LIGHT ADAPTATION ON ELECTRONIC DISPLAY VISIBILITY.**

James Ketchel (Kaiser Aerospace and Electronics Corp., Palo Alto, Calif.).

Information Display, vol. 6, May-June 1969, p. 71-76. 20 refs.

Investigation of the effects of high intensity light adaptation on the visibility of a raster scan, television type, avionic display. The objective of the study was to find out what minimum values of display luminance and contrast a pilot needs to overcome adaptation to high-intensity sky luminance. Two separate studies were conducted, each of which used 24 subjects. The first aimed at determining what levels of symbol luminance are required to yield zero latency times, given certain experimental conditions. The second experiment attempted to determine what levels of contrast are required to yield zero latency times under a different set of treatments.

G.R.

A69-32810 ***ORTHOSTATIC INTOLERANCE AFTER ARTIFICIAL HEAT ACCLIMATIZATION IN PHYSICALLY FIT SUBJECTS.**

J. E. Greenleaf and J. S. Bosco (NASA, Ames Research Center, Biotechnology Div., Moffett Field, Calif.).

Nature, vol. 222, May 31, 1969, p. 891. 5 refs.

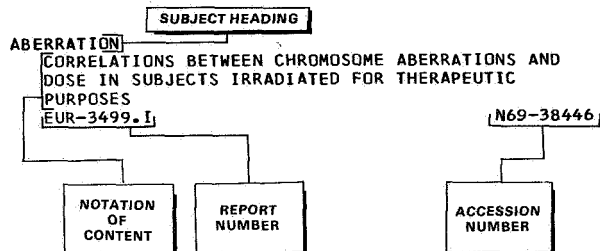
Experimental study of the effects of artificial heat acclimatization on orthostatic tolerance in men exposed to the combined stresses of heat, exercise, and dehydration. Three out of four test persons showed marked orthostatic intolerance, although analysis of fluid losses and levels of total body dehydration does not reasonably explain the effect.

P. G.

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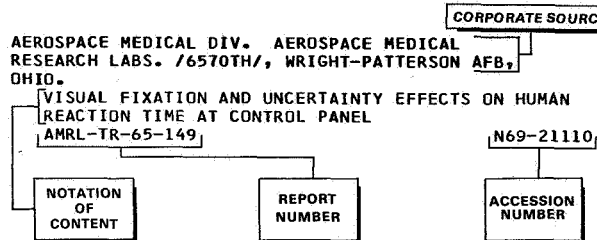
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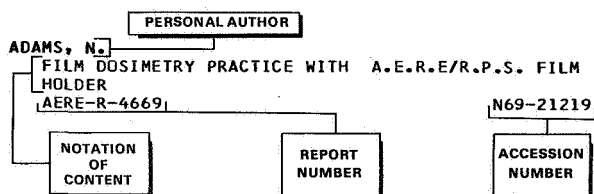
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